AMERICAN FERTILIZER & ALLIED CHEMICALS

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ORGANIC AMMONIATES • *SULPHUR*

VEGETABLE OIL MEALS AND FEEDSTUFFS

ALL FERTILIZER MATERIALS

Foreign and Domestic

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Fertilizer is Wearing a New Dress...

Do customers want to buy fertilizer in good quality, high-count cotton sheeting bags that have home sewing and other secondary uses?

You're mighty right, they do. They're glad to pay the small difference.

Bemis tried it out with fertilizer companies in Southern markets and customers switched in droves to fertilizer packed in the new Bemis H-C (high-count) Sheeting Bags. Now the biggest manufacturers are packing in them. And they're going country-wide.

Besides the valuable secondary uses, Bemis H-C Bags have these advantages:

- ★ They are attractive, attention-getting merchandisable packages.
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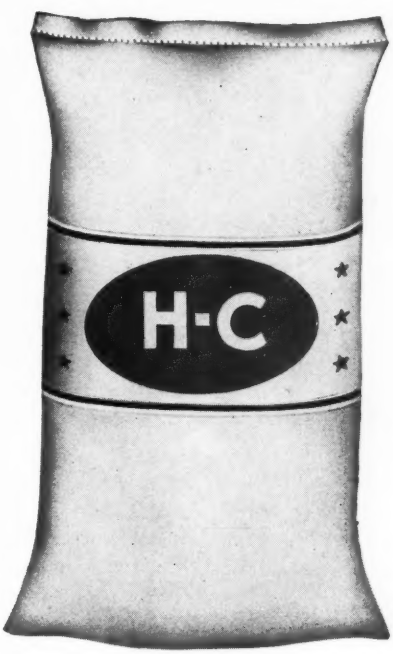
ASK YOUR BEMIS MAN FOR THE COMPLETE STORY AND A SAMPLE BAG . . . OR SEND THE COUPON.

Bemis

BEMIS BRO BAG COMPANY

Bemis H-C (HIGH-COUNT) Sheeting Bags!



BEMIS BRO. BAG CO.
408-N Pine St., St. Louis 2, Mo.

Send complete information about Bemis H-C (high-count) Sheeting Bags for Fertilizer and also a sample bag.

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Address_____

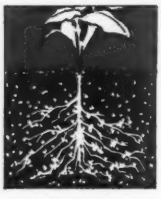
City_____ State_____

THESE GRANULES PROVIDE CONTROL

Only Davison uses an exclusive finishing process that produces superphosphate in granules. Davco Granulated Superphosphate thus offers you a number of sales points that you can use to make your business grow.

1. *Davco Granulated Superphosphate stores without caking, in your warehouse, in the farmer's barn. That's storage control.*

2. *It pours freely in your plant and drills freely and evenly in the field with a minimum of dusting, bridging and clogging. That's handling and application control.*



3. *Each granule has a hardened but porous surface, which releases plant food at a correct rate. That's feeding control.*

Davison is a primary producer of superphosphates, mining its own phosphate rock, producing its own acid, scientifically controlling every step of the process. Thus, you get quick delivery of the highest quality, either bulk or bagged. Price puts you in a favorable competitive position.

Progress through Chemistry

THE DAVISON CHEMICAL CORPORATION

Baltimore 3, Maryland

EXCLUSIVE PRODUCERS OF GRANULATED, AND ONE OF THE OLDEST AND LARGEST PRODUCERS OF NORMAL GRADES OF SUPERPHOSPHATES

In this issue . . .

It's convention time for the fertilizer industry. Your reporters from your favorite farm chemicals journal will be on hand to get a close-up report of the entire doings for you. But a preview of what to expect if you're planning to attend . . . and what you'll miss if you don't go . . . is carried in this issue. As complete a program as was available up to press time is included on the conventions of both the National Fertilizer Association—listed first because it will happen first—and the American Plant Food Council. Important speakers talking about important subjects will be on hand at both confabs and you can find out who they are by turning to page 13 of this issue.

Many a crop has suffered because nitrogen wasn't available at the height of the growing season. In many cases nitrogen fertilizers had been applied, still the crops didn't respond. Suspecting that temperature and soil conditions had something to do with it, soil researchers of Campbell Soup's Agricultural Research Department decided to investigate. Although their work on the subject is an isolated piece of research, it does offer the incentive for further study and gives some hints as to possible fertilizer practices of the future. Graphs and story on page 17.

Radioactive tracers have been used in agricultural research ever since they became available . . . one of the first positive advantages to come out of the atomic energy program. The fertilizer industry has been vitally interested in this research and has contributed money to encourage it. Interested mainly in the use of radioactive phosphors, an Industry Committee has been cooperating with federal and state research agencies ever since 1946. Story and pictures beginning on page 24.

Legumes are often attacked by a harmless looking pest known as the spittlebug but until recently it wasn't considered economical to do anything about them. Now research scientists in Ohio and other states have discovered that it pays to apply pesticides and that the job calls for "remarkably low dosages per acre." The recommended pesticides, the methods and times of applications and other pertinent information are included in an article that starts on page 26.

One of the peculiarities of the chemical industry is that many compounds are formulated each year without the maker having the slighest idea as to what they are good for. It takes a lot of patience, time, and money to develop the compounds to the point where the manufacturer can say to experiment stations and others, "Here, we think this'll be a good pesticide. Take some of it and try it out." Still, that is just what happened recently when a number of manufacturers offered a list of experimental pesticides for just such a purpose. The list and the manufacturers to whom you can write in case you are interested begins on page 20.

American Fertilizer & Allied Chemicals

the magazine of farm chemicals

Established 1894

PIONEER JOURNAL OF THE FARM CHEMICALS INDUSTRY

Vol. 114 **MAY, 1951** **No. 5**

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Cover Story

The spectacular photograph on this month's cover shows the two mammoth (185 feet high) prilling towers which form an integral part of Spencer Chemical's new plant for making fertilizer grade ammonium nitrate. The company says the plant is the largest of its kind in the world.—*Photo courtesy Spencer Chemical Company.*

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IMPORTANT ANGLE ON FARM PROFITS

Plants are not the only things on a farm that depend upon good roots!

So, whether it's pigs or plants you're interested in, good, healthy roots will go a long way toward building profits for you. And one of the surest ways of making certain of having good, healthy roots on *your* farm is through the wise use of the right types of fertilizers.

Many of the most effective of these fertilizers contain potash — often Sunshine State Potash, a product of New Mexico. For potash is not only a soil nutrient, it is a crop strengthener as well, helping to resist disease and drought. Through its considered use, any farmer may be assured of increased crop output, and superior condition at time of harvest.

Reg. U. S. Pat. Off.
HIGRADE MURIATE OF POTASH
62/63% K_2O
GRANULAR MURIATE OF POTASH
50% K_2O MIN.
MANURE SALTS 20% K_2O MIN.

UNITED STATES POTASH COMPANY, ***Incorporated,*** **30 Rockefeller Plaza, New York 20, N. Y.**

AMERICAN FERTILIZER & ALLIED CHEMICALS'

Trends & Forecasts

An Exclusive and Timely Report from Washington by Fred Bailey & Don Lerch

Reduced supplies of sulfur for agriculture are inevitable in the opinion of farm leaders. They also foresee further government controls to tag sulfuric acid through to end-use products.

A fire and brimstone battle is building up in Washington as domestic and export claims for sulfur clash head-on.

Foreign claimants led by Britain say U. S. efficiency closed down production of Spanish pyrites years ago and made them dependent upon us for sulfur. Building of new plants and conversion of old ones capable of using pyrites is being pushed, but they add, if U. S. wants Europe to re-arm fast, our sulfur must be forthcoming.

Their clubs land heavy blows in behind-scenes discussions with Washington officials when they point to our need for strategic metals such as tin from the Belgian Congo, and manganese from India.

ECA and Commerce Department officials are quietly selling the story that the U. S. is a "have-not country" in respect to many war-essential metals and minerals.

Sulfur exports during the second half of this year are expected to exceed the 480,000 long tons licensed for shipment abroad during the first six months. If increased by 76,000 long tons, yearly exports would equal the estimate of foreign requirements, Commerce Department's James C. Foster originally made to the Abernethy Subcommittee.

Francis J. Curtis, newly appointed Administrator of NPA's Chemical, Rubber, and Forest Products Bureau is attacking the sulfur problem on the basis of firsthand observations made during his European tour. He personally inspected Europe's program to convert part of its industry to the use of pyrites. Curtis is an industry man, former vice president of the Monsanto Chemical Co.

USDA is juggling statistics to determine which finished fertilizer and pesticide supplies might be under various types of control programs.

Industry officials are worried over NPA reaction to the anticipated record consumption of fertilizer this year and generally abundant supplies of pesticides. NPA officials are surprised over the relatively few justifiable shortage complaints from farmers. "Hardly a one-aspirin headache," is the way one expert puts it.

Defense and Agriculture Department officials are out-fumbling each other as they toss the nitrogen problem back and forth. Rising prices to farmers, and increasing defense needs may result in re-activating government facilities. Most agricultural interests are backing the re-opening now, before real shortages further boost prices and disrupt fertilizer production.

Washington lawyers are in great demand for interpreting the rash of OPS orders. Experienced OPS officials run for private Shangri-las as soon as they put their hands on a copy of a new regulation. After partially digesting the edict, they correct misinterpretations handed out by their less experienced colleagues.

Appointment of Thomas H. McCormack as Director of the OPS Rubber, Chemicals and Drugs Division is generally applauded by industry and expected to give a business sense to price operations. McCormack is an industry man, formerly director of sales for the Grasselli Chemicals Department of the du Pont Company.

Part of the fertilizer bag comes under Regulation 22--part of it outside, according to OPS officials. They say you are in if you sell manufactured materials to another manufacturer. But, you are outside when handling non-metallic ores such as sulfur, phosphate rock, and potash. Imports are also excluded. Furthermore, the regulation apparently does not apply to fertilizers sold at retail by manufacturers either direct or through agents.

The farm-led drive to trim OPS to size is steadily mounting and may continue down to the June 30th expiration date for the Defense Production Act or beyond.

High level farm production as the most effective control over farm prices is the crux of the farm bloc argument before Congressional committees. Rigid price controls are being blamed for uncertainty among farmers and dislocations in food distribution.

Farm leaders are demanding that the Administration make provision for high production of fertilizer and pesticide supplies. They fear restricted output of essential farm production supplies would increase the pressures for more controls and make subsidies a certainty.

Mounting evidence for new legislation is resulting from continuing hearings of the Delaney Committee's investigation of the use of chemicals in and on food, in the opinion of Washington observers. Even so, the investigation is failing to attract the Washington spotlight.

Absence of klieg lights appears to be having a mellowing effect on members of the pesticide and food industries--at least they admit they will have to live together.

Creation of a super-advisory board to the Food and Drug Administration composed of leading scientists in government, industry, and private research groups is receiving further support from witnesses. Advocates believe such a board would provide a much needed balance to the problem of chemical additives and pesticide residues.

USDA is increasingly concerned over the split scheduling of its witnesses. Officials feel that such practice weakens their testimony and effectiveness in presenting the farm viewpoint.

The greatest menace to small grains in 20 years is attacking Spring wheat, could invade winter wheat and possibly barley. Scientists have identified the culprit as a small grain rust called race 15-B.

Dr. Robert M. Salter, chief of the Bureau of Plant Industry, Soils and Agricultural Engineering, has expressed fears that the rust--if unchecked--could "nearly finish" the spring wheat crop. He has asked for special funds to speed research for resistant varieties and chemical control measures.

Beltsville scientists are searching for an effective fungicide sufficiently low in cost to make large scale field application practical. If they succeed, it would introduce a new era of pest control-field application of a fungicide to a low-value crop.

The constant threat of unexpected pest outbreaks to the nation's food supply is seen by industry and farm leaders as bolstering their arguments for continued high-level pesticide production and the maintenance of large research facilities.

Farm Chemicals . . . and CMP

Beginning July 1, NPA's Controlled Materials Plan will go into effect. Although farm chemicals are not, in general, included in the direct control program, their production depends upon the availability of the materials that are controlled.

Developed during World War II, CMP—with certain changes to fit the present situation—depends upon the control of the three basic materials; steel, copper, and aluminum. Their direct control is designed to indirectly govern all other production in a way that best guarantees a balanced flow of materials to the right place at the right time.

Up to now, the Defense Department, the Department of Commerce, and the Department of Agriculture had no accurate way of knowing how much of each type of material was available at any given time. Without regard for or knowledge of the overall needs of the nation even during these times of dire peril, unscrupulous operators, taken across the country as a group, could hog a large segment of the available supply of a vital material. Now, under CMP regulation 2, the accumulation of excessive inventories of controlled materials is forbidden. The regulation governs the situation at both ends and in the middle by limiting the quantities of steel, copper, and aluminum that can be ordered, received, or delivered.

Even manufacturers, making an honest effort to order, use, and deliver only those materials they needed, had no way of evaluating the relative importance of the various DO rated orders they received. Under CMP, Regulation 3 puts some sense into this phase of the materials supply picture by defining the preference status of delivery orders for both controlled and uncontrolled materials. To serve as a guide for manufacturers, NPA recently issued a Product Assignment Directory, listing over 13,000 items and indicating in each case the NPA industry division handling the product.

Additional CMP regulations prescribe delivery of controlled materials, tell how to get materials for maintenance, repair, and operating supplies, how to get materials for construction, and give the rules under which a repairman may buy controlled materials. Now let's see how all this applies to the farm chemicals industry.

First of all, the construction of new facilities for the manufacture of benzene and chlorine—two basic materials for many pesticides—is considered to be so important that the Department of Defense has encouraged chlorine plant expansion by including such facilities in a tax amortization program. Certificates of Necessity have been issued to members of industry allowing them to deduct from taxable income from 40 to 100 per cent of the cost of the authorized construction during the next five-year period. Under this plant-expansion program, plants valued at $212,162,598 for making chlorine and caustic soda have been approved with $106,081,299 deductible from income tax for these two products alone. Such a plant expansion program would be impossible without a controlled materials plan to insure the availability of the needed materials.

CMP, however, cannot increase the supply of steel, copper, or aluminum; nor can it eliminate all industry hardships. There'll still be some hardships; and there'll be some added paper work—especially at the beginning. On the other hand, Defense officials are sure that under CMP, all business will get fair treatment. Help will be provided to small producers and to service shops. If CMP is going to work, however, industry will have to cooperate wholeheartedly. There are two important ways it can do this:

1. Translating essential production needs into materials requirements—both controlled and uncontrolled—and making this information available to the government.

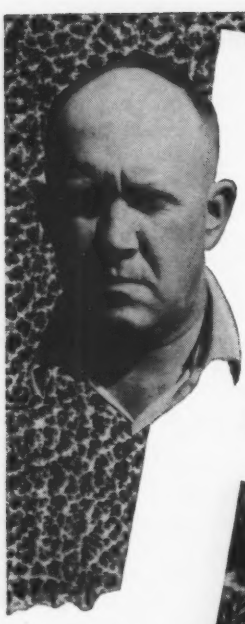
2. Planning essential production and construction is all very nice, but it is industry—not government—which must turn out the work as planned and on schedule.

As producers of farm chemicals vital to the health of the nation, readers of these columns have a responsibility to do what they can to make CMP work. It is the only way tried so far that offers this industry some chance of getting the materials it needs without scuttling the rest of the defense program.

As a part of the industry which it serves, AMERICAN FERTILIZER AND ALLIED CHEMICALS is eager to help in any way possible. From time to time you, as a manufacturer may have questions about the nature or some detail of CMP as it applies to your business. Often the proper official or agency to contact about a specific problem may be obscure or difficult to obtain. If so, this office is ready to help by answering questions, digging out pertinent data, or simply by putting you in contact with the proper official or agency.

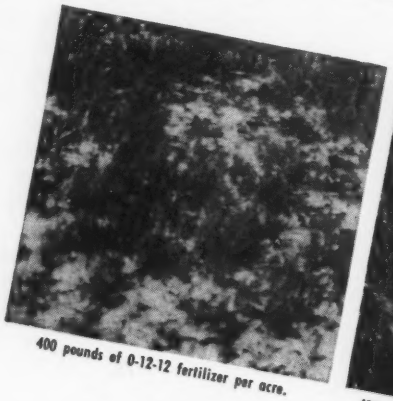
Also, as experts at the operating level, you know better than anyone else the immediate problems that face the farm chemicals industry. This journal considers it a privilege and a duty to the industry to serve as a clearing house for such suggestions, criticisms, or just plain gripes that may, in some way, help get the job done as Americans like to see a job done. That is, efficiently, quickly, and—if possible—cheaply. But, in any case, to get it done.

—A. M. BRODINE

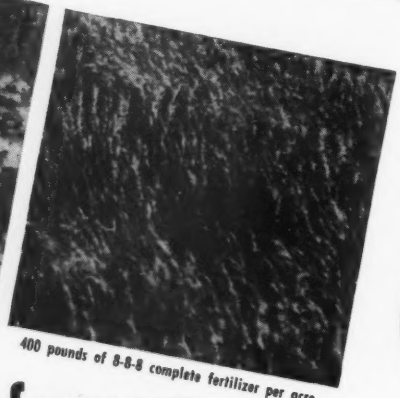


Pastures treated with 8-8-8 carried 30% more cattle for Beryl Wayt, Michigantown, Ind.

"I applied 8-8-8 at the rate of 400 pounds per acre on 25 acres of Big English bluegrass and ladino clover," says Mr. Wayt. "I also applied 400 pounds of 0-12-12 on 10 acres of the same mixture. The pasture treated with 8-8-8 carried 30 per cent more cattle per acre than the pasture treated with 0-12-12."



400 pounds of 0-12-12 fertilizer per acre.



400 pounds of 8-8-8 complete fertilizer per acre.

USS AMMONIUM SULPHATE UNITED STATES STEEL

Bigger yields for farmers ...better business for you

● Experiences like that of Mr. Wayt are convincing farmers that high-analysis mixed fertilizers point the way to bigger yields and bigger profits every time.

You can obtain your full share of this business by including in your line high-grade complete fertilizers in which U·S·S Ammonium Sulphate provides a major part of the nitrogen. Fertilizers containing U·S·S Ammonium Sulphate stand up well in storage . . . perform well in drills and other distributing equipment . . . pay off in increased yields.

You'll probably find supplies of Ammonium Sulphate somewhat shorter this year so plan your needs well in advance. United States Steel Company, 525 William Penn Place, Pittsburgh 30, Pa.

USS TRADE MARK

U·S·S AMMONIUM SULPHATE

UNITED STATES STEEL

June Conventions

National Fertilizer Association

June 11-13

White Sulphur Springs, W. Va.

American Plant Food Council

June 15-17

Hot Springs, Va.

LEADERS in industry, agriculture, and government will be taking an active part in the fertilizer industry's annual get-togethers to be held this year June 11–17. Practically the entire industry will be represented at the conventions of the National Fertilizer Association and of the American Plant Food Council whose meetings will be held, in that order, a scant 30-miles apart.

Convening at the Greenbrier, White Sulphur Springs, West Virginia, June 11 through 13, NFA will feature meetings, open forum discussions, important speeches, and a wide variety of social and sports events. On Monday, at 10 a.m. NFA's board of directors will meet, with Chairman of the Board J. E. Totman, president of Summers Fertilizer Company, Baltimore, Md., presiding.

At the same time, the Plant Food Research Committee of NFA is scheduled to hold an open meeting at which a panel of experts will review recent research on the growing of corn. Proctor Gull, chairman of the corn subcommittee will direct the meeting.

Among the speakers who will address the NFA conventioners are Senator Clinton Anderson, former Secretary of Agriculture; Edward G. Nourse; and Edward J. Condon. Nourse was formerly chairman of the President's Council of Economic Advisors and has recently been awarded a Guggenheim fellowship for studies on private enterprise. Condon is president of the Friends of the Land and is assistant to the president of Sears, Roebuck and Company.

A garden party for women will be held on June 11, and a bridge party for them is scheduled for the following day. Prior to the convention, entry blanks for several tournaments and contests were available to members and contributors to NFA. A golf tournament is scheduled for June 11, 12, and 13. The committee on golf, headed by A. L. Walker, Jr., whose mailing address is 75 East 45th Street, New York 17, N. Y., has planned a variety of golfing events as follows:

Members' Golf Tournaments
Monday, Tuesday, Wednesday

Veterans' Golf Tournament
Tuesday

Guests' Golf Tournament
Tuesday

Women's Golf Tournament
18 holes—Tuesday (10 a.m.)

Women's Putting, Golfers
Monday (10 a.m.)

Women's Putting, Non-golfers
Monday (2 p.m.)

Entries must be in the hands of the Golf Committee before 6 p.m., June 9.

The Contest Committee on Horseshoe Pitching, chairmanned by A. A. Schultz, president, Reading Bone Fertilizer Company, Reading, Pa., has also planned a two-day contest to be held on Monday and Tuesday. Entries should be in the hands of the Committee not later than 6 p.m. of the day preceding any event.

Tennis tournaments for both men and women are scheduled for Monday and Tuesday and all entries must be mailed so as to be in the hands of the Committee not later than 6 p.m., June 6. Address Chairman, Tennis Committee, James C. Totman, Summers Fertilizer Company, Bangor, Me.

Regular rules will be followed for all the sports events and apparently there will be trophies and awards galore. Awards will be made at the discretion of the Committee and only those properly entered in the respective tournaments will be eligible.

A banquet is to be held Tuesday night, for which the Greenbrier is making a charge of $4.20 in addition to other fees and charges at the convention.

The American Plant Food Council will begin its sixth annual convention at The Homestead, Hot Springs, Virginia, at 10:00 a.m., June 15, following registration the morning of the previous day.

American Plant Food Council conventioners will hear nationally known members of Congress, USDA and other government officials, soil scientists, spokesmen for the press and radio as well as representatives of county agents and vocational cgriculture teachers.

Five hundred Council members and their guests are expected to establish a new attendance record at the convention. Following the invocation by the Reverend H. Carlton Fox, Paul T. Truitt, council president, will open the program with an address on Friday morning. Senator Allen J. Ellender, chairman of the Senate Committee on Agriculture and Forestry, will be the second speaker and his subject will be "Agriculture . . . Our First Line of Defense."

"Fertilizer Use in Relation to

Charles F. Brannan, Secretary of Agriculture

Senator Clinton B. Anderson

Animal Nutrition" will be the subject of Dr. H. E. Meyers, head of the Department of Agronomy, Kansas State College, who will be the final speaker on the opening day.

Secretary of Agriculture Charles F. Brannan will be the first speaker at the second session of the Plant Food Council convention. He will talk on the subject of "Farming in a Defense Economy."

An agricultural forum on "Fertilizer's Contribution to Better Living," will be a feature of the Saturday morning part of the program. The forum will be made up of Dr. Paul D. Sanders, editor, The Southern Planter, acting as moderator; Ferdie Deering, president of the American Agricultural Editors Association; Dr. R. Frank Poole, president of the Association of Land-Grant Colleges and Universities; Phil Alampi, president of the National Association of County Agricultural Agents; and Robert A. Wall, vice-president of the National Vocational Agriculture Teachers Association.

Eight new members of the Board of Directors will be elected at a brief business session scheduled for Saturday morning at 11:45 a.m.

At a banquet Saturday evening, Representative Walter H. Judd, (R-Minn.) will speak on "Danger Signs in Our Domestic Economy." Elected to the 78th, 79th, and 80th Congresses, Judd is considered a leading authority on American foreign policy.

The Board of Directors of the Council will re-convene on June 17 for the purpose of electing the Executive Committee and Committee Chairman.

It won't be all work and no play at the Plant Food Council's convention, either. A variety of entertainment features are planned. These include the annual Golf and Tennis Tournaments and Special Events for women. As at all such gatherings, there is a good deal of behind-the-scenes work that has to be done to make things come off smoothly. The committees responsible for the various activities at the Plant Food Council's convention are as follows:

Credentials—J. C. Crissey, president, G.L.F. Soil Building Service, Ithaca, N. Y., chairman; John R. Riley, Jr., vice-president, Spencer

Chemical Company, Kansas City, Mo.; W. B. Hicks, president, Wilson and Toomer Fertilizer Company, Jacksonville, Fla.

Golf—Dean R. Gidney, United States Potash Company, New York City, chairman; C. F. Burroughs, Jr., president, F. S. Royster Guano Company, Norfolk, Va.; R. B. Lenhart, G.L.F. Soil Building Service, Ithaca, N. Y.; W. F. McLane, Lyons Fertilizer Company, Tampa, Fla.; and John R. Roberts, Pioneer Phosphate Company, Des Moines, Iowa.

Tennis — Alfred J. Dickinson, Virginia-Carolina Chemical Corp., Richmond, Va., chairman; Benjamin H. Brewster, Jr., Baugh and Sons, Baltimore, Md.; and William J. Rabel, American Cyanamid Co., New York City, N. Y.

Hospitality — Fred J. Woods, president, The Gulf Fertilizer Company, Tampa, Fla., chairman; John Hall, Potash Company of America, Washington, D. C.; R. F. Boynton, United States Potash Company, Atlanta, Ga.; Roy F. Camp, Chilean Nitrate Sales Corp., New York City, N. Y.; W. B. Copeland, Smith-Douglass Company, Inc., Norfolk, Va.; J. D. Stewart, Jr., Federal Chemical Company, Inc., Louisville, Ky.; G. Tracy Cunningham, Armour Fertilizer Works, Atlanta, Ga.; Dr. S. F. Thornton, F. S. Royster Guano Company, Norfolk, Va.; and E. M. Kitchen, Pacific Coast Borax Company, Beaver Dam, Wisc.

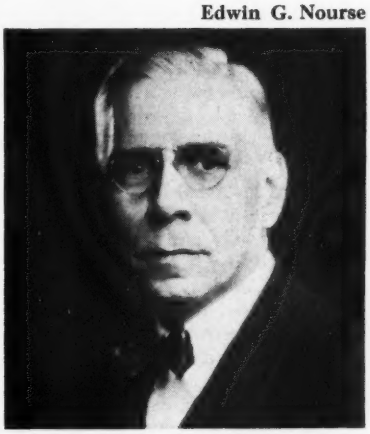
Ladies—Mrs. J. D. Stewart, Jr., Louisville, Kentucky, chairman; Mrs. Horace M. Albright, New York City, N. Y.; Mrs. Harry B. Caldwell, Greensboro, N. C.; Mrs. L. Dudley George, II, Richmond, Va.; Mrs. John E. Sanford, Atlanta, Ga.; and Mrs. G. A. Woods, Raleigh, N. C.

Chairman of the American Plant Food Council's 1951 Convention Committee is W. T. Wright, vice-president, F. S. Royster Guano Company, Norfolk, Va. Other members are: John V. Collis, president, Federal Chemical Company, Inc., Louisville, Ky.; J. A. Howell, president, Virginia-Carolina Chemical Corp., Richmond, Va.; A. F. Reed, vice-president, Lion Oil Company, El Dorado, Ark.; and Paul Speer, vice-president, United States Potash Company, New York City, N. Y. ◆

Senator Allen J. Ellender

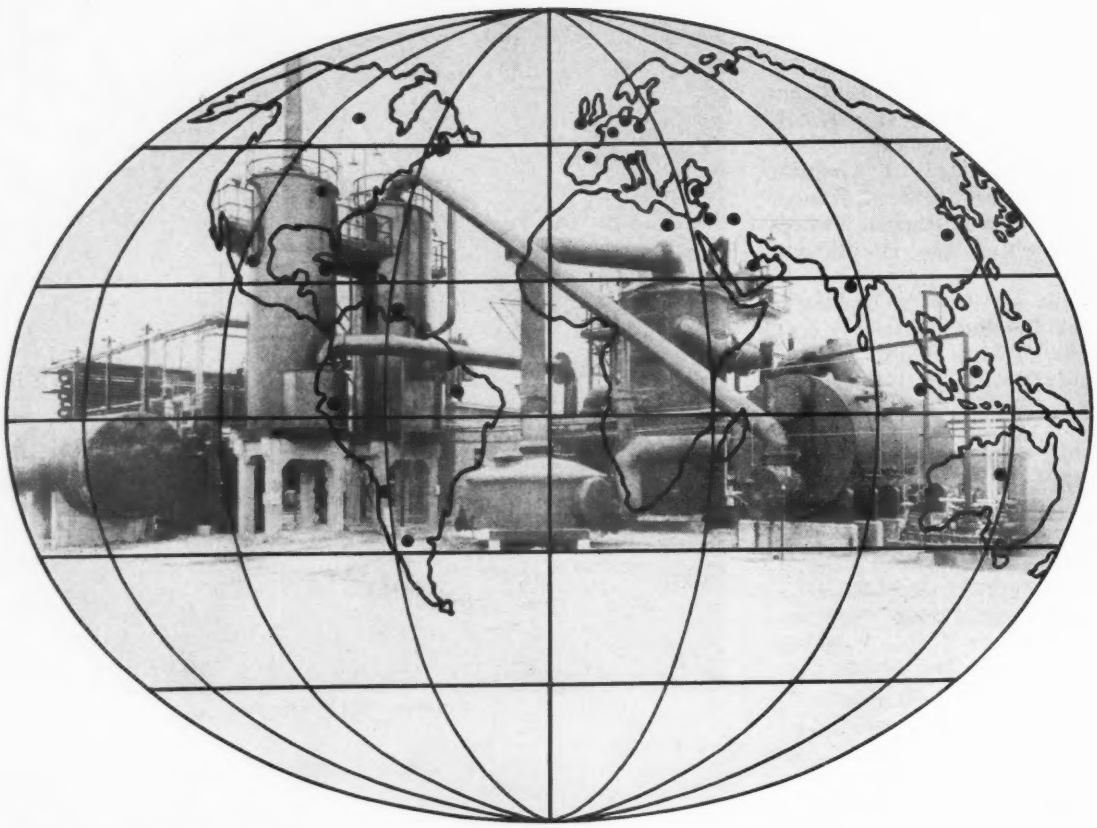
E. J. Condon

Edwin G. Nourse



Ferdie Deering

Rep. Walter H. Judd



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MONSANTO
CHEMICALS AND PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

How temperature and rainfall affect

Nitrification of Ammonia Salts

J. B. Hester, R. L. Isaacs, Jr., and F. A. Shelton
Department of Agricultural Research, Campbell Soup Co.

PRODUCTION of well-nourished, satisfactory tomato plants depends upon adequate available plant nutrients in the root zone. In Georgia, this availability of nitrogen becomes a limiting production factor under many conditions each year. Because of the general nitrogen-deficient conditions which develop in the area after heavy rainfall and during cool weather, a study was made to determine the influence of temperature and soil conditions upon the nitrification of commercial ammoniacal salts.

For the most part, the tomato plants produced in the area studied are grown on newly cleared ground or ground that has been cleared only a few years. This land is composed, mainly, of Tifton, Orangeburg, Norfolk, and Magnolia sandy loams. The *p*H value of these soils is approximately 5.5 and they are extremely low in available plant nutrients. In general, the nitrogen-to-carbon ratio ranges between 1-to-20 and 1-to-30, that is, between 20 and 30 parts carbon for one part nitrogen. In other words, the native organic materials are highly carbonaceous and low in nitrogen.

One of the fertilizer mixtures most commonly used in the area is a 4–10–6. Much of the nitrogen in the mixture is derived from ammoniated superphosphate, sulfate of ammonia, and other ammonia salts. For these reasons, the fertilizer compounded for use in this study was a 4–10–6, using regular superphosphate, sulfate of ammonia, 60 per cent muriate of potash, and finely-ground dolomitic limestone.

Table I indicates that changes in temperature of the soil within the seed zone depend considerably upon the amount of sunshine and the temperature of the air, two factors that vary widely. Rainfall also fluctuates a great deal and, during periods of heavy rainfall, the leaching of nitrate nitrogen is almost complete.

During the early part of the season, soil temperatures vary between 50° F and 60° F. Sometimes the temperature goes as low as 40° F. Consequently, it was decided to determine the formation of nitrate nitrogen at three temperatures in the approximate range of those encountered during the average growing season in the soils under study.

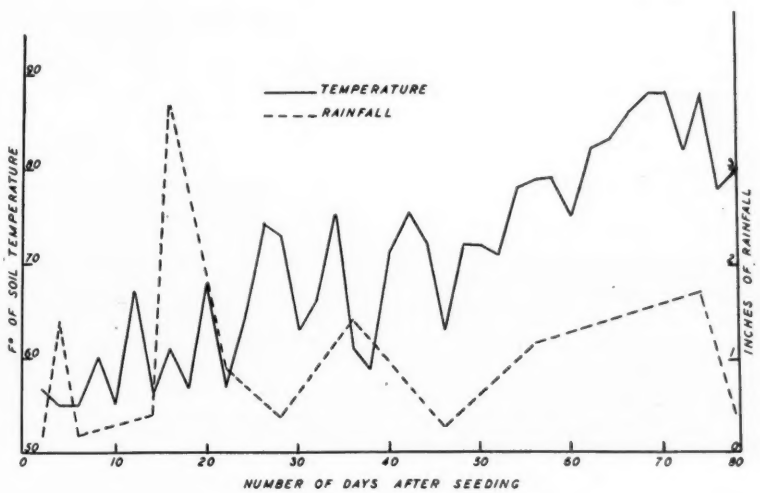
Tifton sandy loam was obtained from four different fields in Colquitt, Thomas, and Grady counties, Georgia. Each batch was divided into three lots. One lot received no fertilizer; another was treated with a 4–10–6 fertilizer at a rate equivalent to 500 pounds per acre; and the third lot had 1000 pounds of 4–10–6 added.

These rates of fertilization were based upon the premise that the top six inches of an acre of soil weighs two million pounds. The applications used represent a concentrated row-application and actually amount to greater than 500 and 1000 pounds per acre in the root zone. The moisture content was adjusted to optimum field conditions and maintained throughout the test.

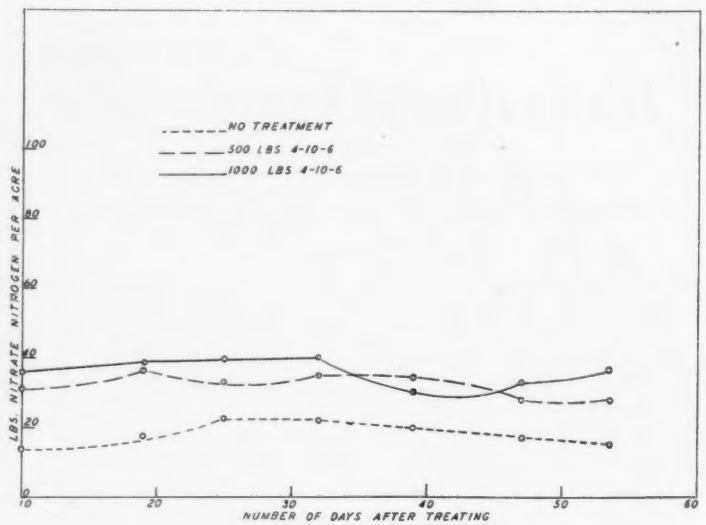
A gallon container of each lot from each treatment was placed in a chamber in which the temperature ranged from 45° F to 55° F; another lot was placed in a chamber ranging from 65° F to 75° F; and the third lot in a chamber maintained at 80° F. Because of the nitrogen-to-carbon ratio in the soil, nitrification at the higher temperatures in the lot without fertilizer was slow.

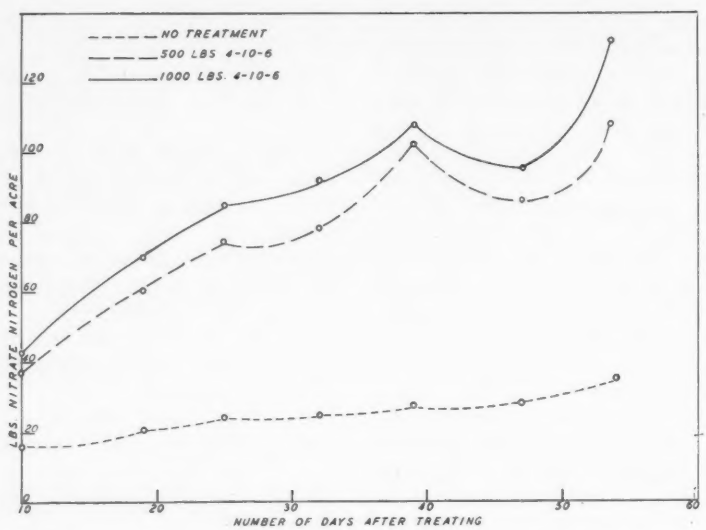
With each increase in the rate of fertilizer application, nitrification was increased. Eighty degrees produced the greatest amount of nitrification with the largest application of fertilizer, but in the 65–75° F chamber it was comparatively rapid. This undoubtedly accounts for the fact that tomato plants grow more rapidly as the season progresses and have a tendency to become succulent because of the excessive amounts of nitrate nitrogen present in the root zone at the time. ◆

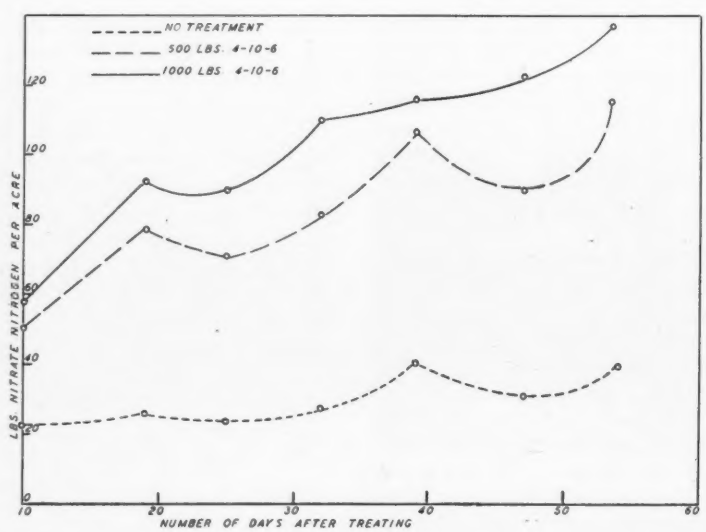
Table I. Changes in temperature of the soil within the seed zone and in the rate of rainfall affect nitrification. Experimental data is shown on page 18.



The charts below show how the rate of nitrification of ammonia salts increases with additional applications of nitrate nitrogen for various numbers of days after planting. Note that largest use of fertilizer gives highest rate.







Suppliers Offer list of

Experimental Weedkillers

WEED CONTROL is fast becoming a major agricultural activity. Laborious, time-consuming hand and machine cultivation has been supplanted in many instances and greatly reduced in others by the use of herbicides. The development of 2,4-D provided the industry with an unusual impetus by making possible selective weed control.

At present, many chemical compounds are being tested as possible selective or non-selective herbicides. Experiment stations are carrying on numerous field tests of the new materials and comparing them with results obtained from older, more established chemicals.

Recently—in response to a letter sent out by the Northeastern Weed Control Conference—manufacturers and formulators of farm chemicals made available a list of materials for experimental use during the current season. Many of the materials are different forms of herbicides already in use. Others are untried as weed-control compounds.

Following is a list of materials now being offered by these manufacturers for experimental work this season. For further details concerning their use, the the organization listing the material should be consulted directly.

Aero Cyanate Minimum guarantee—91% potassium cyanate. Relatively non-toxic to warm blooded animals; has caused no skin reaction or other discomfort in people applying it so far. A bibliography of recent work with the substance is available.

Aero Cyanamid, granular, 44% calcium cyanamide. Detailed suggestions for experiments on pre-emergence and pre-planting use can be obtained.

Aero Cyanamid, special grade, 57% calcium cyanamide. Used as dust for pre-emergence residual and contact control and defoliation of cotton, field beans, etc. Advanced experimental work being carried out for post-emergence use and top-killing of tomatoes, potatoes and forage crops for grain or seed production. Bibliography of recent work is available.

American Cyanamid Company, T. R. Cox, Agricultural Chemicals Division, 30 Rockefeller Plaza, New York, 20, N. Y.

ACP 644 1-lb. IPC per gallon. Toxicity not fully determined and it should be handled with care. Emulsifiable in water.

ACP 646-A 2-lbs. substituted amide of 2,4-D. Not water soluble but can be mixed with fuel or Diesel oil for application. Leaches less rapidly than other forms and is not broken down by soil bacteria as rapidly. Might be tried for pre-emergence work on crops resistant to 2,4-D. May be available also in wettable form.

Weedone LV-4 4-lbs 2,4-D acid per gallon as butoxy ethanol ester. Less volatile than older esters, it should be tried at lower rate. More effective than standard formulations for studying translocation on perennial weeds.

Weedar MCP 2-lbs, 2-methyl 4-chlorophenoxy-acetic acid per gallon as alkanolamine. Suggested use for oats seeded to legumes is ¼-lb. per acre in low water volumes preferably not over 5 to 6 gallons per acre. Should be tried experimentally on flax, peas, sorghum and as a pre-emergence compound on beans. Use also on weed problems not solved by 2,4-D or 2,4,5-T. Definitely selective but not always easier on crops than the other materials.

2,4-D and **2,4,5-T** formulations of amines in oil, water soluble esters and acid are available. Weedone Brush Killer 64 and Weedone 2,4,5-T are available and a new formulation adapted especially to basal spraying can be obtained.

American Chemical Paint Company, R. H. Beatty, Agricultural Chemicals Division, Ambler, Pa.

Crag Herbicide 1 Sodium 2,4-dichlorophenoxyethyl sulfate. Suggested application rate: 1½- to 3-lb. per acre for control of germinating weeds in large-seeded, deeply-planted crops.

Experimental Herbicide 2-73 (73% dichloral urea.) Used at 7- to 14-lbs. per acre for control of germinating annual grass weeds in cotton, tobacco, cucurbits, etc., and at 65- to 130-lbs. per acre for control of established annual and perennial grasses.

Experimental Herbicide 5722 (60% phenoxyethyl trichloroacetate.) For control of germinating annual grass weeds in alfalfa, beets, cotton, conifers, and cucurbits a 2⅓- to 4⅔-qts. per acre.

DIAC (2,4-dichlorophenoxy isopropylaminecitrate, 73% acid equivalent.) Same rates and applications as ester and amines of 2,4-D now in use.

PEG 300-2,4,5-T (polyethylene glycol 300 ester of 2,4,5-T; 66% acid equivalent.) Suggested at same rates and applications as 2,4,5-T esters currently used.

Crag Agricultural Chemicals, J. B. Harry, Carbide and Carbon Chemicals Company, 30 E. 42nd Street, New York 17, N. Y.

Chlorax Spray Powder Formulation of special form of borate and sodium chlorate wet-blended and crystallized. Powder completely soluble in water at recommended concentrations. Offers kill of weeds and grasses plus residual effect discouraging regrowth. Not selective. Useful as contact spray at lighter doses.

Chipman Chemical Company, Inc., Mr. Bales, Director of Field Research, Bound Brook, N. J.

Amine Formulation of 2-methyl 4-chloro phenoxyacetic acid (4-chloro o-toloxyacetic acid). Shows promise for selective control in legumes. MCP seems to have longer residual action in soil than does 2,4-D which may be important in some pre-emergence control.

Premerge Contains alkanolamine salts of dinitro-o-sec butylphenol. Especially for pre-emergence use on large seeded crops. Being used commercially this year. Shows promise for use on peanuts, beans, etc.

A-1100 Amine of 2,4,5-T. 4-lbs. acid equivalent per gallon.

Calcium TCA Tests indicate it is equivalent to Sodium TCA in effectiveness against grasses. Apparent advantages: less irritation in handling, lower hygroscopicity.

Esteron 245 Commercial low volatile propylene glycol butyl ether ester material.

Esteron Brush Killer Contains propylene glycol butyl ether esters of 2,4-D and 2,4,5-T to extent of 2-lbs. acid equivalent of each, per gallon.

Selective Weed Killer Contains ammonium salt of dinitro-o-sec-butylphenol. Very effective on chickweed, and shows promise in many other situations.

General Suggested for experimental use as contact pre-emergence application on various crops. Used as a contact agent on fruit plantings.

Estron Ten Ten Low volatility 2,4-D with 4-lbs. acid equivalent as propylene glycol butyl ether esters.

The Dow Chemical Company, Dr. Lawrence Southwick, Agricultural Chemicals Section, Technical Service and Development, Midland, Michigan.

80% CMU Weed Killer Para-chlorophenyl-1, 1-dimethylurea formulation, 80% active ingredient. Wettable powder. Company suggests tests as general herbicides at 10- to 80-lbs. per acre; also at ¼- to 2-lbs. per acre as pre-emergence treatment. Does not kill by contact.

E. I. du Pont de Nemours & Co., Inc., Dr. D. E. Wolfe, Grasselli Chemicals Dept., Agricultural Biological Section, Experimental Station, Wilmington 98, Delaware.

Goodrite N.I.X. Sodium isopropyl xanthate. Used on annual weeds including young grasses on beans and onion plants, evergreens, peas, corn, etc. Shields or directed spray are advisable. Low toxicity, no residual action.

Good-Rite Okton chlorinated ketone. Pre-emergent for all annuals and some shallow-rooted perennials. No residual effects. Can be applied safely 6 hours before seedling emergence.

B. F. Goodrich Chemical Company, Dr. J. H. Standen, Agricultural Chemicals Development, 324 Rose Building, Cleveland 15, Ohio.

Tat C-Lect Fortified. Dry formulations for crabgrass and weeds and mercury formulations under different names, basically the same formula.

O. E. Linck Company, W. Van Buren, Valley Road and Route 6, Clifton, N. J.

Sulfasan ethyl xanthogen disulfide. Insoluble in water, applied in oil carrier. Acts as contact herbicide on emerged vegetation; soil action not completely investigated. Used also as post-emergent.

Monsanto Chemical Company, H. E. Bruner, Rubber Service Dept., Akron 11, Ohio.

Maleic Hydrazide Diethanolamine salt to be called ME-30. Suggested use in temporary inhibition

of plant growth and as an herbicide. Detail-data sheet for experimental tests will be ready soon.

N-1-Naphthyl Phthalamic Acid. Wettable powder for pre-emergence crabgrass and other grass control. Not effective as post-emergent. Data sheet available later.

Naugatuck Chemical Division, U. S. Rubber Company, Dr. J. W. Zukel, Naugatuck Plant, Naugatuck, Conn.

Technical IPC Technical chloro-IPC, 40% emulsifiable chloro-IPC; 50% wettable IPC available as experimental samples.

Pittsburgh Plate Glass Company, Dr. E. D. Witman, Columbia Chemical Division, Market Research and Development, 5th Ave and Bellefield, Pittsburgh 13, Pa.

Polybor-Chlorate 88 Has all desirable qualities of regular polybor-chlorate. Water soluble, non-selective; 22% sodium chlorate and 36% boric oxide equivalent.

Borascu Sodium borate ore. Non-selective, toxic to most types of vegetation. Used where bare surface is desired. Concentrated Borascu about twice as effective per pound.

Pacific Coast Borax Company, W. L. Klatt, Weed Control Division, 510 W. 6th Street, Los Angeles 14, California.

Niagarathal-W 38% Endothal (Sharples trade name for technical grade di-sodium 3, 6-endoxo-hexehydrophthalate.) Contact material for non-crop areas as non-selective herbicide. Use from 5- to 10-lbs. per acre in at least 200 gallons of water. Complete kill of deep-rooted perennial broadleaf plants and grasses generally not practical. Detailed information sheet available.

Niagara Chemical Division, J. L. Poland, Food Machinery & Chemical Corp., Department of Research and Development, Middleport, N. Y.

Triton X-100 100% active. Alkylated aryl polyether alcohol. Non-ionic wetting detergent and emulsifying agent. Oil and water soluble.

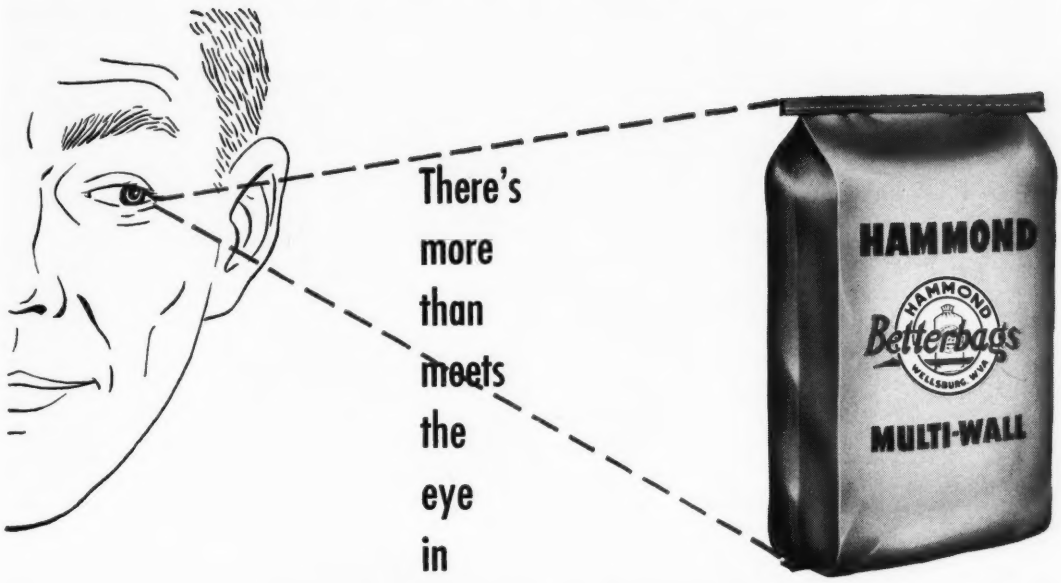
Triton B-1956 modified phthalic glycerol alkyd resin. Used as a wetting agent, spreader, emulsifier. Soluble in oil and water.

Triton X-45 alkylated aryl polyether alcohol, 100% active. Liquid is soluble in oil, insoluble in water.

Kathon E-40 55.6% isopropyl ester of 2,4-D acid.

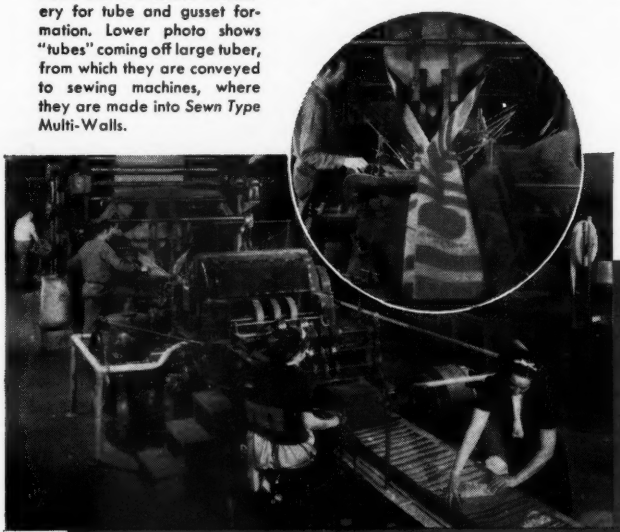
Kathon M-7 49.8% dimethylamine salt of 2,4-D acid.

Rohm & Haas Company, G. A. Brandes, Agricultural Chemicals Department, West Washington Square, Philadelphia 5, Pa. ◆



HAMMOND *Multi-Wall* BAGS

Insert shows intricate machinery for tube and gusset formation. Lower photo shows "tubes" coming off large tuber, from which they are conveyed to sewing machines, where they are made into *Sewn Type* Multi-Walls.



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Radioactive superphosphate is produced in a special laboratory like this in which all the necessary equipment is shown. At far left is the acidulator, next, the movable table with lead shield, the drier, the disintegrator, the ammoniator, and—to right of post—a mixer. Radioactive super is being removed from the disintegrator and will be emptied into the mixer. After testing, the material is sent to all parts of the nation for use.

Tagged Element Research Projects

CONTRIBUTIONS by the fertilizer industry have played an essential part in financing recent agricultural research projects involving the use of radioactive elements. Reporting this fact in a recent letter to contributors to the program, Dr. Vincent Sauchelli described a number of field experiments for 1951, together with a detailed statement of the projects by regions of the country.

Radioactive elements have been an important part of agricultural research ever since they first became available. Their greatest value has been to allow scientists to determine for the first time exactly how a wide variety of chemicals are taken up and used by plants. By tagging various chemicals with radioactive isotopes that can be traced through their entire cycle within the plant, scientists have been able to measure the efficiency of fertilizers and other farm chemicals.

The Industry Committee on Radioactive and Tagged Element Research, of which Dr. Sauchelli is chairman, has been active since September, 1946. The committee collects funds and cooperates with federal and state research agencies. Activities sponsored by the group have been confined to the initiation and support of research projects designed to make use of the radioactive tracer technique in the solution of agronomic problems involving nutrient phosphorus.

The first contribution in 1946 initiated a program that has since grown and expanded to all regions of the country. "Although relatively small at present," says Dr. F. W. Parker, USDA Bureau of Plant Industry, "industry's contribution continues to catalyze the entire program.

"For example," he reports, "the estimated expenditures by various agencies for this cooperative work in 1951 amount to $235,000 of which the industry contribution is $16,000. However, our funds are used in such a vital way that without that money the program would seriously suffer."

Below is a radioautograph of a type of tobacco leaf fertilized with radioactive superphosphate.

AMERICAN FERTILIZER & ALLIED CHEMICAL

To the first appeal in 1946, the fertilizer industry contributed $12,450. In 1947, $20,100 came in from industry; in 1948, $22,800; and in 1950, $15,300. Following is a summary of the projects supported by the group:

For 1951, 114 field experiments with radioactive phosphorus are to be conducted on 23 crops in 29 states and Canada. Here are some of the objectives of the studies this year: "Comparison of Fertilizer Materials;" "Granulation of Fertilizers;" "Time and Method of Fertilizer Application;" "Surface Applications to Sod Crops;" "Foliar Sprays;" "Effect of Lime on Phosphorus Availability;" "Effect of N and K on Phosphorus Availability;" "Effect of Irrigation on Phosphorus Availability;" "Root Extension Studies;" "Comparison of Crops;" "Residual Phosphorus Availability."

In addition, the program also includes a series of uniform experiments designed to provide material to aid in developing methods for diagnosis of the phosphorus fertility status of soils.

In the Northeast, four experiments with oats and wheat are scheduled, with two states participating. Twenty-one experiments with oats, in nine different states, are to be conducted in the North Central region. In the South, 16 experiments are to be carried out with cotton and three with oats; while in the West, covering six states and Canada, 24 experiments will be conducted with spring wheat. USDA's Bureau of Plant Industry, Soils and Engineering will prepare and supply a total of 270 pounds of P_2O_5 containing 24.5 curies of P32 for all the cooperative experiments.

In the Northeast, at the New Hampshire Agricultural Experiment Station, a comparison will be made of the relative absorption of phosphorus by apple trees and fruits from foliar sprays, and from soil applications of fertilizer, using radioactive phosphorus as a tracer. Objectives of the comparisons will be: (1) to determine whether apple trees can absorb phosphorus applied to their leaves in foliar sprays. (2) To determine which of several salts of phosphorus is absorbed most readily by apple leaves. (3) To determine the comparative rates of absorption of phosphorus from foliar sprays and soil applied phosphates. (4) To determine the effect on apples resulting from applications of phosphorus as a foliar spray with that as a salt applied directly to the soil around the trees.

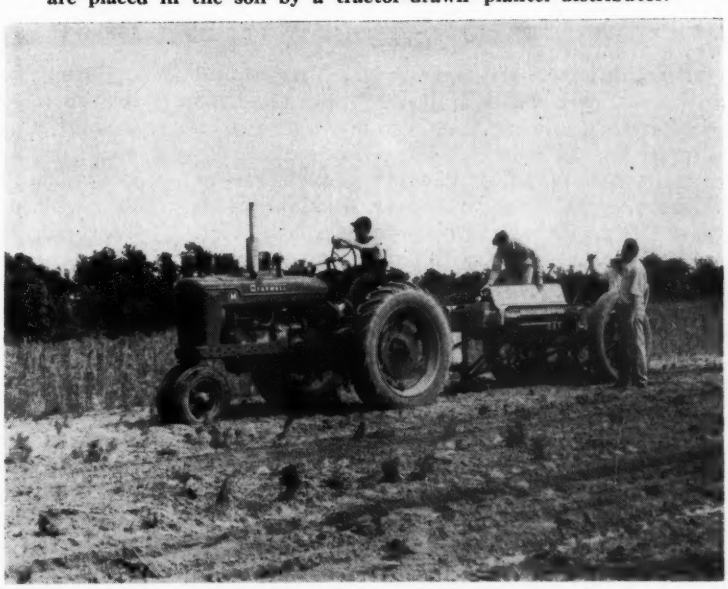
At the Maine Agricultural Experiment Station, factors affecting the use of fertilizer and soil phosphorus by oats, potatoes, and blueberries will be studied. The studies will attempt (1) to determine the effect of granulation on the use of phosphorus by potatoes; (2) to study the relationship of phosphorus use by oats and clover from soils having different levels of available phosphorus and soil test values; and (3) to determine to what extent phosphate fertilizer is used by native blueberry plants.

In the Southern region, at the Virginia Agricultural Experiment Station, a project will investigate the utilization of fertilizer phosphorus applied as a top dressing on permanent pastures and meadows. Among the objectives of this project will be (1) to measure the influence of granulation and placement of superphosphate on established stands of ladino clover-orchard grass and bluegrass-white clover mixtures; (2) to measure the influence of rates of superphosphate fertilization for establishing ladino clover-orchard grass mixtures on maintenance requirements of P_2O_5; and (3) to measure the relative suitability of winter and spring applications of superphosphate.

At the North Carolina Agricultural Experiment Station, the committee will sponsor a project to study utilization of calcium, by crops, from the calcium phosphate, sulfate, and carbonate contained in mixed fertilizer. Objectives of the study will be: (1) To estimate the fraction of plant calcium originating from each of the three sources of calcium (monocalcium phosphate, gypsum, and calcium carbonate) in a typical tobacco fertilizer. (2) To estimate the fertilizer contribution to the tobacco plant's calcium at each of several stages of growth and to determine the distribution of the fertilizer calcium within the plant. (3) To compare the utilization of calcium and phosphorus from monocalcium phosphate. (4) To evaluate the hazards of field application of radio-calcium by tracing the movement of the labeled compounds horizontally and vertically in the soil, and by recovery of Ca45 in crops grown after the tobacco crop. (5) To determine the possibility of reducing the hazards of field use of radio-calcium by swamping out the Ca45 through heavy applications of $CaCO3$ or $CaSO_4$.

(Continued on page 46)

Radioactive fertilizers being applied for a utilization test on corn. Fertilizers previously "tagged" with radioactive phosphorus are placed in the soil by a tractor-drawn planter-distributor.



Young spittlebugs (shown with spittle removed) feed beneath the masses of spittle which they constantly secrete.

Control of Spittlebug in Legumes

Information and photographs courtesy Ohio State University

MUCH OF THE FAILURE of red clover and the season's first crop of alfalfa to produce satisfactory yields during the last 5 years has been caused by outbreaks of spittlebug. The insects responsible are named after the masses of spittle-like secretions—sometimes called "rabbit spit" by children and misinformed adults—which the young bugs or nymphs produce. From one to several nymphs may live within the same spittle-mass, which is attached to stems and leaves of clover and alfalfa during early-season plant growth. Spittlebugs also attack strawberry plants and many weeds.

Research carried on in Ohio and neighboring states, together with insecticidal usage in Ohio, has enabled scientists at Ohio State University and the Ohio Agricultural Experiment Station to arrive at a practical procedure for control. The procedure calls for the application of either Benzene Hexachloride or Toxaphene against the *very young nymphs* in the spittle masses. Tests made by Ohio entomologists, T. H. Parks and C. R. Weaver, with ground and air spraying and dusting equipment, showed that it is economical and practical to apply insecticidal treatment with what the scientists term "remarkably low dosages per acre" for control. Scientists from other areas have reached conclusions similar to those of the Ohio investigators.

In Ohio, masses of spittle are present from the third week in April to the middle of June. Nymphs develop rapidly during May and transform into adults during the 10 days preceding the harvest of the first crop of alfalfa and clover. The presence of the *young* bugs, feeding within the spittle-masses, has a definite stunting effect on the plant they attack. The bugs may also cause damage in their adult stage, but they no longer secrete spittle.

Adult spittlebugs have wings and look like strong, out-sized leafhoppers. They can fly or jump for several feet when disturbed. When hay is being cut, the adults fly or jump in great numbers in front of the mower. Before the cut hay is taken up from the swath these adults fly to border areas where they assemble on other crops or on weeds. Many of them migrate back to the hay field after the new growth gets started, as the second growth is attractive to them.

During the summer, adults feed on foliage, which they share with leafhoppers and plant bugs that also migrate into the legume fields. With such a mixed insect population during July and August, entomologists find it difficult to determine just how much of the sizable loss in hay or seed yield is caused by spittlebugs and how much by other pests.

Adults Migrate in Fall

Adult spittlebugs remain in or around clover and alfalfa, or in weed areas, until autumn. Then they again migrate. Many fly to the new seedling crop of legumes in grain stubble and lay their eggs on hosts such as dandelion, whitetop, wild parsnip, and plantain. The insect winters in the egg state, closely spaced in a row in old stems or stubble. In central Ohio, hatching begins in mid-April and continues for 3 or 4 weeks. By the second week in May, most of the

eggs have hatched; the spittle-masses are much in evidence and damage is well underway.

The Ohio entomologists, Parks and Weaver, basing their recommendations on a 3-year test in their home state, say the clover hay yield can be increased from 25 to 55 per cent by an application of benzene hexachloride late in April or the first week in May. In the spring of 1950, Ohio farmers treated approximately 85,000 acres of legumes. Average estimated increase in yield was 27.6 per cent. Much of the acreage was treated too late in May, however, to obtain maximum benefit.

That is why the Ohio entomologists say it is important to apply the insecticide early and before damage has progressed too far if the greatest returns are to be obtained. This requires examination of the young clover or alfalfa growth frequently during April and the first week in May. One or two small spittle-masses per plant on or between the expanding leaves should be enough to prompt immediate action. At this time, new growth is likely to be under 5-inches, and there will be no trouble about contaminating the hay crop with spray residue, because the harvesting date is still a month or more away. However: *The field should not be pastured during the 3 weeks following the treatment!*

Recommended Concentrations

Most economical form of benzene hexachloride recommended by the Ohio entomologists is a water miscible concentrate carrying 10 to 11 per cent gamma isomer, or the wettable powder carrying 6 to 12 per cent gamma isomer. There is no objection to the musty odor found in unrefined benzene hexachloride if the insecticide is applied to hay crops early in the season. The wettable powder form is adaptable only for high volume sprayers using pressures of more than 100 pounds per square inch. The wettable powder form also may be formulated into a dust for application by airplane or by power-driven ground dusters.

The liquid form, or water miscible concentrate, is suited for all types of sprayers, but it is the only form found by Parks and Weaver to be satisfactory for use in low volume weed sprayers and in liquid sprays applied by airplane.

Toxaphene, widely used against grasshoppers and armyworms, has been quite effective against young spittlebugs in the frothy spittle-masses. Demonstrations in Ohio and Indiana show that at applications of 1.5 pounds per acre it is equal in effectiveness to 0.2 pound gamma benzene hexachloride. Although it does not have the pungent odor of BHC, it may, if applied too late in May, be more objectionable than benzene hexachloride in possible residue hazards.

Suggested Rates for Use

Toxaphene, regardless of the form used, should be applied at the rate of one and one-half pounds of actual toxaphene per acre. The liquid concentrate carries 60 per cent of the toxicant, and the wettable powder has 40 per cent. The amount of BHC required per acre is approximately 0.2 pound of gamma isomer, the toxic material in that substance.

Investigations in Ohio during 1950 compared low and high volume equipment for spittlebug control. Prior to the 1950 season, little detailed knowledge of the best utilization of low-volume sprayers was available. The practical experience gained in 1950 with this type of equipment will enable many farmers to do a better job of spraying—and get more effective use out of their chosen pesticides—next season. Professor Weaver says, "Research at the Ohio Agricultural Experiment Station during the past year has provided information that may lead to more efficient utilization of low volume equipment in the coming seasons."

Biggest trick involved in low-volume spraying is to spray early. Low volume applications at pressures from 20 to 40 pounds per square inch should be made when the clover and alfalfa plants are only 4 to 6 inches high. In experimental control work, low volume applications made after the clover was 8 inches high were not nearly as effective as those applied earlier. The failure of farmers to treat their fields early enough has been the greatest cause for poor or mediocre results from treatment of spittlebugs. Delay in application will result not only in inferior control but will increase the likelihood of an insecticide residue on the finished crop.

Volume of spray depends on three things: the pressure used, the speed with which the sprayer is driven across the field, and the size of the openings in the spray nozzle. "Weed" nozzles in common use today deliver 5 gallons of spray material at 30 pounds pressure when the tractor is driven 4 mph. This combination has been used extensively for spittlebug control, but Professor Weaver maintains that the combination should be used only while the clover is small and shortly after the spittlebugs are found in appreciable numbers.

Low-volume spraying with an inexpensive tractor mounted rig like this can be used to control spittlebugs in legumes and at a cost which makes it practicable.

As the plants grow larger, a larger volume of spray is required. Ten gallons per acre is a preferable amount and when the application is delayed the higher gallonage is essential. To increase the amount of insecticide delivered per acre, the tractor speed can be reduced or nozzles with larger opening can be installed. Nozzles are available that will deliver 10 gallons per acre at 30 pounds pressure at a tractor speed of 4 mph.; and larger nozzles are preferable to a slower tractor speed because of the saving in time.

For best control with low volume equipment the 10 gal. per acre; 30 pounds pressure: 4 mph. combination is recommended. Airplane spraying with low gallonage per acre applications is effective only when the plants are small. Pressures of more than 50 to 60 pounds have been found to be not necessary or desirable with low volume applications. High pressure, high gallonage per acre sprayers are effective in any stage of growth if the spray is driven with force throughout the foliage. It is not necessary to break the spray into a fine mist.

Aircraft Applications

BHC dust carrying 1 per cent of the gamma isomer is suitable for application by airplane or ground duster at the rate of 25 to 30 pounds per acre applied evenly over the young growth. The foliage doesn't have to be wet with dew when applying the dust, but good coverage is best accomplished in the morning or evening when there is little or no air movement.

If the legume growth is heavy, control by dust application may not be satisfactory near the ground. Subsequent rains which wash the dust down are helpful. Dusting is most satisfactory under good weather conditions and before the growth is too far advanced.

Low pressure or "weed control" sprayers are satisfactory to use with the soluble or water miscible type of material. Such sprayers cannot be expected to handle the wettable powder in the high concentration required for low gallonage applications. Trouble from nozzle-clogging can then be anticipated. If the sprayer has been used for weed control, the equipment must be thoroughly cleaned so the clover or alfalfa will not be injured by 2,4-D remaining in the equipment. Those who do attempt to use these weed sprayers are cautioned to clean them thoroughly with household ammonia—1 gallon in 100 gallons of water—before using them for legumes. The drum used for the 2,4-D preferably should not be used for spraying legumes.

Controlling spittlebugs with concentrate spray applied by aircraft is satisfactory but has its limitations. Coverage is likely to be too light and lack sufficient distribution on the lower parts of the plants unless they are small. Airplane spraying is recommended only during the early period, say 10 days to 2 weeks of spittlebug development, following their first appearance.

High volume sprayers, capable of delivering 100 to 300 pounds pressure and carrying a boom that distributes the spray evenly, are effective for all situations concerned. They are heavy to pull through a meadow where soil conditions and the weight of a large quantity of water contribute to mechanical damage.

Airplane or ground dusting is successful when the application is well-timed and the hay has not attained too much growth. Airplane dusting or spraying can be done when the ground is soft; therefore, without damage to the field or hay. If the application is made before the plants are more than 6 inches high, the dust will give fairly good control immediately. If dust is not applied until the growth is tall and dense, it will take a rain to wash the dust down into the spittle-masses low on the stems to kill the insects located near the ground. Dust applications are limited to periods when weather conditions are favorable and should never be undertaken in a strong wind.

Spraying or dusting for the immature insects in the masses of spittle will control only the insects in the first crop of hay. During mid-summer, the adults from other fields and from weed areas will migrate into the treated field when the second growth has become attractive to them. Benzene hexachloride does not give satisfactory control of the adult spittlebugs. No insecticide can be recommended at present for use on second crop hay to be fed dairy cattle.

The Ohio investigators found that the cost of complete treatment is highly worthwhile if the stand of hay is good and spittlebugs threaten to damage it. Based on current prices of insecticides, the entomologists estimated that treatment of spittlebug would be between $1.00 and $1.50 per acre. Parks and Weaver found that the cost of 10 per cent unrefined water miscible BHC was comparable to that of powder. Cost of treatment with Toxaphene, they said, should not exceed $2.00 per acre.

Custom Applicators

Custom applicators were charging from $1.25 to $1.75 per acre during 1950. Sizes of fields and other jobs available in the same community enter into the cost of airplane treatments. These costs should vary little, if any, from those charged for ground treatment. Complete cost of treatment for spittlebug, either with BHC or Toxaphene, whether with ground or aerial equipment, will range somewhere between $2.25 and $4.00 per acre, based on prices prevailing in 1950.

Adult spittlebugs can be controlled—if the second crop is to be grown for seed—by a 5 per cent DDT dust applied at about 30 pounds per acre. This treatment will also control leafhoppers, alfalfa bugs, plant bugs, and young grasshoppers. It will not kill clover-root borers nor full-grown grasshoppers. If grasshoppers are a problem, Parks and Weaver recommend mixing Toxaphene with the DDT. This should be applied when the clover or alfalfa is in the bud stage and before more than 10 per cent of the heads are opening into bloom. This will benefit greatly the seed crop and promote outstanding yield increases, the Ohio entomologists report.

Airplane applications have a distinct advantage at this stage of growth of the crop, and dusting takes precedence over spraying, because better distribution is obtained with less likelihood of serious residue problems. Fields so treated should not be used for pasture and the chaff or straw coming from the combine or thresher should not be fed to dairy cows in milk production. ◆

FERTILIZER MATERIALS MARKET

New York

May 9, 1951

Sulphate of Ammonia

This material remains in tight supply with no price changes noted and demand heavy. What the new contract prices will be is rather a difficult question. There is a heavy export demand with supplies scant.

Nitrate of Soda

Supplies of this material are reported good and demand also continues good. No particular shortage is anticipated.

Ammonium Nitrate

New price schedules are expected soon on this material and demand is not quite as heavy as a few weeks ago. Shipments are going forward against contracts.

Nitrogenous Tankage

Some domestic producers are quoting as high as $6.00 per unit of ammonia ($7.29 per unit N) f.o.b. shipping points and production is off at some plants, due to shortage of sulfuric acid. Some imported material has been offered but few sales reported.

Castor Pomace

A limited amount offered for June delivery at $5.50 per unit of ammonia ($6.68 per unit N) f.o.b. production points. This material is cheaper than most other organics.

Organics

Spotty demand existed for most organic materials, with the fertilizer season in some sections drawing to a close. Vegetable meals were on the easy side, due to lack of buying in the feed trade and soybean meal after selling as high as $69.00 f.o.b. Decatur, Ill., in bulk, slipped to $64.00 for nearby shipment. Linseed meal was in poor demand and nominally quoted at $65.00 per ton in bulk, f.o.b. Eastern points. Cottonseed meal was in fair demand. Tankage is offered at $8.50 per unit of ammonia ($10.33 per unit N) and blood at the same price, with demand poor and lower tendencies indicated.

Fishmeal

Some spot Menhaden fishmeal sold as low as $127.50 per ton, f.o.b. Eastern points. Demand was poor and supplies adequate. Various heavy arrivals of imported materials have kept the domestic market from advancing and with the approach of the heavy fishing season even lower prices are expected. A good sized quantity of fish scrap has been reported sold on a "when, and, if-made" basis but the price has been left open.

Bonemeal

A gradual easing in demand is noted for both fertilizer and feed grades. Last prices were $65.00 to $67.50 per ton, f.o.b. shipping points, but better prices might be obtained with firm bids.

Hoofmeal

This material was a little lower in price and last sales were made on basis of $7.50 per unit of ammonia ($9.12 per unit N), f.o.b. Chicago. Demand fair.

Superphosphate

While shortages are reported in a number of sections, the demand has eased up somewhat because the season is fairly well over, with no price changes. Triple superphosphate continues to be very scarce except for contract customers. No new prices have been announced yet for the coming season.

Potash

Two domestic producers have announced their price schedules for the coming season at $0.42 per unit of K_2O, f.o.b. Carlsbad, New Mexico, in bulk with usual discounts allowed. Material for quick shipment is in heavy demand.

Philadelphia

May 9, 1951

Organics are easier and the demand considerably relaxed, but the chemicals are exceedingly scarce with practically no resale offerings.

Sulphate of Ammonia.—This material is in quite tight supply with production very much reduced. Decidedly little resale is offered, and what has come on the market has been at prices ranging from $50.00 to $75.00 per ton, with no interest shown at the higher figures. However, it should be recognized that much of the price increase includes additional freight and handling costs.

Ammonium Nitrate.—This article is still very scarce and there are no offerings in the market. The original producer price of $69.50 at Canadian shipping point is entirely nominal.

Nitrate of Soda.—Shipments continue to keep up with contract demands but the supply is rather tight. It moves at the regular contract prices of $50.00 bulk and $53.50 gas for imported, with $45.00 bulk and $48.50 bags for domestic.

Blood, Tankage, Bone.—Blood is easier at $8.50 per unit of ammonia ($10.33 per unit N) with tankage a trifle stronger. Hoof meal is quoted at $7.50 per unit of ammonia ($9.12 per unit N) in Chicago area. Bone meal is somewhat easier at $60.00 for imported, and $65.00 to $67.50 for domestic.

Castor Pomace.—This has been out of the market except for contract shipments, but a limited tonnage will soon be available. Last price was $5.50 per unit of ammonia ($6.68 per unit N) at the producing works.

Fish Scrap.—Trading is very limited. Producers are waiting on the Federal authorities for a ceiling price, and while $130.00 is quoted for Menhaden meal, the price is purely nominal.

Phosphate Rock. — Shipments move principally on contracts, and acidulators are limited as to what they can take, due to acid scarcity.

Superphosphate. — Demand is much greater than the supply, and nothing offered in the open market which is entirely nominal at $0.76 to $0.81 per unit for normal grade, and $0.87 for concentrated, plus freight in each case.

Potash.—Domestic shipments are heavy and against contracts. New purchases at original producer prices are impossible. There have been quotations on muriate of potash from Europe at $0.70 per unit K_2O.

Charleston

May 8, 1951

Demand for the three prime fertilizer ingredients continues steady, with no prospects that for the new season superphosphate, nitrogen, and potash will be in strong market position in that order.

Organics.—Demand for fertilizer organics at this time is in seasonal dimensions, but prospects for the new season are that supplies will be tight and the market firm. Current prices for prompt shipment of domestic nitrogenous tankages are $3.50 to $6.00 per unit of ammonia, $4.25 to $7.29 per unit N, in bulk, with very limited quantities being offered. Offerings of imported nitrogenous are also scarce for prompt and future shipment. Last sales were reported at $6.25 per unit of ammonia in bags, c.i.f. usual Atlantic ports for summer shipment.

Castor Pomace.—Domestic producers are limiting shipment period to May/June and prospects for shipment thereafter are quite uncertain, due to the fact that sources of castor beans are not offering at this time. Limited quantities of castor pomace are now being offered for May/June shipment at $5.50 per unit of ammonia, $6.68 per unit N, bagged, f.o.b. Northeastern shipping points. Small tonnages of imported material are offered for summer shipment at around $46.00 to $48.00 per ton in bags, c.i.f. Atlantic ports.

Dried Ground Blood.—The Chicago market is weaker at $8.50 to $8.75 per unit of ammonia, $10.33 to $10.63 per unit N, in bulk delivered Chicago area. The New York market is around $8.50 to $9.00, $10.33 to $10.94 per unit N.

Potash. — Demand continues heavy and shipments steady against contract commitments. Plants are producing at capacity levels. Current price for muriate of potash is $0.42 per unit of K_2O in bulk f.o.b. Carlsbad, New Mexico and $0.505 per unit f.o.b. Trona, California.

Ground Cotton Bur Ash.—This form of potash, primarily a carbonate of potash, is now moving in good volume with analyses running rather consistently around 40 per cent K_2O. Prices vary from $0.65 to $0.75 per unit K_2O f.o.b. Texas production points.

Phosphate Rock.—Demand for high grade rock is strong and supplies relatively scarce, but plenty of lower test material is available. Movement continues steady against contracts, hampered only by reduced supplies of sulfuric acid.

Superphosphate.—This material is definitely tight and prices are at ceiling levels depending upon individual producer's ceilings. The Baltimore market is around $0.81 per unit APA for normal grade superphosphate and the Charleston market nominally $0.81 to $0.84 with no supplies being offered.

Sulfate of Ammonia.—Supplies continue tight and the market at ceiling levels. Coke-oven production varies in price from $32.00 to $45.00 depending on whether it is contract or spot business.

Ammonium Nitrate. — Demand continues in excess of supply and prices are at ceiling levels. Canadian production is priced at $69.50, packed in bags, f.o.b. Port Robinson, Ontario, with Western domestic production selling at $61.00 to $63.00 per ton, in bags, f.o.b. works.

Nitrate of Soda.—Domestic production is reported shut-down. Imported material is arriving steadily and supplies are approximately equal to those of the 1950 season. Demand, however, is greater than the supply. Domestic price is $48.50 per ton in bags, f.o.b. works, with imported at $53.50 f.o.b. cars Atlantic Gulf and Pacific ports.

In fishing it's fun to take a chance,
not to know what the luck will be
In business it's best to know

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Industrial News

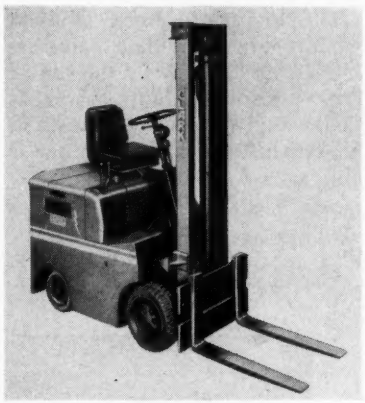
New Products *New Plants* *New Appointments*

New Clark Fork-Lift Truck

Features of the new Clipper, electric battery-powered fork-lift truck developed by Clark Equipment Co., include increased speed, 2000-lb. capacity at 24-inch load-center, "fingertip" directional lever, automatic acceleration, "deadman" safety control, pivot-mounted steering axle and cushion style wheels.

The "fingertip" directional control lever mounted on the steering column provides selection of direction of travel and simultaneous engagement of first point of power. This is designed to simplify operation, increase maneuvering speed and permit fast get-away. Elimination of jerking and possibility of "human error" are provided by automatic acceleration. Shifts from one point of power to another are timed automatically according to torque requirements.

When the driver's seat is vacated the control lever is locked in neutral and a parking brake on the motor drive shaft is set automatically. The truck can be moved only when the driver's seat is occupied or depressed.



Clark Clipper

Dimensions of the Clipper are: overall length, less forks, 63⅝ inches; overall width, 34 inches; wheelbase, 37 inches; turning radius, 61½ inches; minimum intersecting aisles, 57 inches. Overall height of standard uprights with forks down is 83 inches and the overall height at maximum lift is 142½ inches. Other uprights and tiering heights are available.

Full information may be obtained by writing AMERICAN FERTILIZER AND ALLIED CHEMICALS.

Shell Expert Aids Fight Against Locusts in Iran

Dr. John Hardy, director of a Shell Chemical Corp. agricultural research laboratory and an expert on pest control in the Middle East, has been flown to Iran to aid in the fight against the locust plague now threatening that country. Hardy will help direct the application of aldrin made available by the Shell Corp.

The U. S. State Department, USDA, U. S. Overseas Airlines and suppliers cooperated to prepare the emergency aid for the Iranian government. Within four days of the appeal for assistance, 13 tons of the new chemical and six disassembled single-engined planes were enroute to the stricken area by DC-4 Skymaster planes.

The locust infestation threatens 130,000 square miles of cultivated land in southern Iran. Immediately affected are the nation's wheat and barley crops.

Nukem Releases Literature on New Plant Equipment

Nukem Products Corporation has released new literature on Nu-Kast pumps and heat exchangers. Both products are especially designed for the transfer of hot or cold corrosive liquids.

Nu-Kast pumps are made of cast resins with no metal in contact with the solutions. Transfer range is up to 100 GPM at varying heads and the stuffing box is completely eliminated. Nukem-Karbate heat exchangers are light and compact, and also utilize the acid resistance of non-metallic materials. They will raise solution temperatures 100° F in two and a half hours and in addition may be used for cooling purposes.

Write AMERICAN FERTILIZER AND ALLIED CHEMICALS for a copy of the Nukem descriptive folder.

Commercial Solvents Names Currey Director

Brownlee O. Currey has been elected to the Board of Directors of Commercial Solvents Corp. Currey is president and a director of

Brownlee O. Currey

Equitable Securities Corp., Nashville, Tenn., and in addition is a director of several organizations including American Express Co., Standard Fruit and Steamship Co., Transcontinental Bus System, Inc., and Farm and Ranch Publishing Co., of which he is publisher.

Two personnel shifts have been announced by Commercial Sol-

vents. E. N. Thomas has been appointed Assistant Manager of the Sales Promotion Division. Thomas became associated with the firm in 1946 as Technical Writer.

William E. Evans, Jr., has been transferred by the Agricultural Division from Terre Haute, Ind., to Atlanta, Ga. Evans will handle the company's sales of fertilizer, insecticides, and feed supplements throughout the South.

Five Davison Plants Were Accident-Free in 1950

Five of the Davison Chemical Corp.'s ten plants had an unblemished safety record in 1950. The record exceeded that made in 1949 when two of the plants received recognition from the National Safety Council and the Bureau of Mines.

On April 30 last year the Curtis Bay unit broke its all-time record by completing 1,646,388 manhours without a lost-time accident. An accident in January of this year terminated another casualty-free period of almost a million manhours.

The Phosphate Rock Division completed over a million manhours without an accident by the end of 1950. Four other plants, located at Savannah, Perry, New Orleans, and Alliance had worked for over a year without a lost-time injury as of December 31st.

New Seal for Platform Scales

A new method of sealing platform scales against corrosion of working parts has been under test for over three years in the Augusta, Ga., area. The Cunningham Scale Seal Co. claims that their method has proven successful, tests showing no apparent corrosion of parts after three years of exposure to fertilizer materials.

Write AMERICAN FERTILIZER AND ALLIED CHEMICALS for further information.

Spencer Completes Prilling Plant

THE WORLD'S largest ammonium nitrate prilling plant has been constructed by Spencer Chemical Company and is now in operation. Though only one of the two 185-foot prilling towers has been placed into production as yet, the second is expected to be ready for use by August. After its completion, the anticipated capacity of the plant is for more than 1,000 tons of prilled material per day.

The plant has been built as a part of Spencer's Jayhawk Works located near Pittsburg, Kan. Since Jayhawk is a producer of ammonia and ammoniating solutions, the addition of fertilizer-grade ammonium nitrate to the production schedule makes it an integrated operation.

An aerial view of Spencer Chemical's new ammonium nitrate prilling plant. One tower is in operation and the other will be ready in August.

Ammonium nitrate has for many years been recognized as a superior fertilizer material but because of the physical characteristics of the crystalline material, its use was not considered practical. Early attempts to produce a completely dry product were unsatisfactory because the material produced still had a tendency to cake up.

TVA engineers found that ordinary grained ammonium nitrate produced with conventional equipment had possibilities. They also discovered that by adding approximately 1 per cent of a coating agent consisting of paraffin, petrolatum, and rosin along with 4 per cent kaolin clay, the material had the free-flowing characteristics necessary for farm use.

This material did not prove entirely satisfactory. The many particles of very small diameter had a tendency to clog up feed shoots of the fertilizer application machinery.

Two Canadian engineers, of the Consolidated Mining and Smelting Company, were working on the problem at the same time the TVA men were engaged in their research. Standing at the top of a tall building, they poured a concentrated solution of ammonium nitrate through a tomato can having a small hole in the bottom. The liquid material emerging from the hole as a stream, broke up and formed small round particles before striking the ground.

This very simple experiment provided the clue leading to the process developed for producing prilled material. The Canadians, noticing the similarity between the "frozen" droplets of ammonium nitrate and small nuggets, dubbed them

"prills." This, in miner's jargon, means very small nuggets.

The Spencer operation is based on the processes originated and developed by the Canadian concern. Engineers of Consolidated Mining and Smelting developed first a pilot plant and then full scale facilities for the production of prilled ammonium nitrate. The material was well received by farmers because of its uniformity and excellent storage and flowability qualities.

After the successful establishment of this plant, American firms entered into licensing agreements with the Canadians for construction and operation of the same type facilities in the United States. Most overlooked weather conditions in this country, particularly humidity. The American plants functioned alright in cool dry weather but when the air became extremely humid, production had to be curtailed until more favorable weather conditions. Moisture laden air often occurred just when farm demand for the nitrogen material was greatest.

The Spencer organization began investigations to improve the process for producing fertilizer-grade ammonium nitrate in 1943. Research along various lines of investigation was carried out and the prilling process was finally decided on.

A pilot plant operation developed in the Research and Development Department was used as a basis for the Engineering Department to develop the designs and plans for a full scale plant. A Spencer subsidiary, Quaker Valley Contractors, Inc., erected the facilities in about twelve months.

Company officials were well pleased with the new unit. The initial material met specifications and was loaded into box cars immediately. Kenneth A. Spencer, president of the company, said, "We are currently producing an excellent product which we are confident will meet competition from any quarter." George E. Frey was named superintendent of the plant.

International Minerals Constructs Phosphate Plant

A new phosphate chemical plant is now being constructed in Florida by International Minerals & Chemical Corp. The ten million dollar project will produce defluorinated phosphate for the animal feed manufacturing industry and multiple superphosphate for fertilizer producers. Uranium compounds will be recovered as a by-product.

Louis Ware, president of the corporation, stated that it will employ new processes developed by their research division which have been under pilot plant tests for the past two years.

The plant will be located adjacent to International's phosphate mining property near Mulberry. Rust Engineering Co. has been engaged as the engineer contractor and the project is being supervised by International's engineering division.

It is estimated that about a year will be required to complete the plant and get it into operation. When completed production is expected to be 100,000 tons of defluorinated phosphate annually.

Baker In Charge of Sales For Seacoast Laboratories

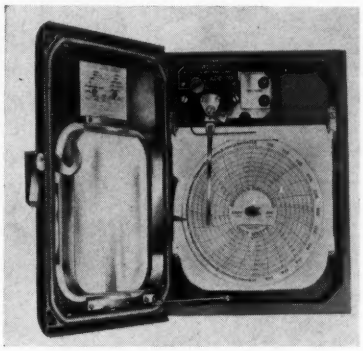
Irvin Baker has been named vice-president in charge of sales for Seacoast Laboratories, Inc. Formerly associated with the insecticide division of General Chemical Division, Allied Chemical & Dye Corp., he will now take over the insecticide and fungicide division of Seacoast.

New Line of Bristol Recorders

A new line of recording voltmeters and ammeters is now being produced by the Bristol Company. Known as the Series 500 Electric Recorders they make a continuous record of voltage or current on an 8-inch circular chart.

An entirely new measuring mechanism and other improvements are featured in the new series. A moving-iron measuring mechanism produces a high actuating torque at a low electrical burden. It has shock-protected precision stainless steel bearings, magnetic damping and a locking device to prevent damage from rough handling.

Moisture, fume and dust proof die-cast aluminum alloy cases house the instruments. Both are furnished in portable and pole mounted models for wall, surface panel or flush panel mounting with open terminal or conduit connections.



Bristol Recording Voltmeter

Bulletin E1111 describes the various models, ranges, specifications and uses and may be obtained by writing AMERICAN FERTILIZER AND ALLIED CHEMICALS.

Tallman Named New Lion Oil Research Director

Dr. Ralph C. Tallman has been named Director of Research for Lion Oil Company. Tallman, previously manager of the planning and survey department of the research division, replaced Dr. Frank J. Soday who resigned to take a position with Chemstrand Corp.

A native of Cedar Falls, Iowa, Tallman held the position of research director for Schieffelin & Co. from 1935 to 1943. He was project leader and patent chemist in the central research laboratory of Allied Chemical & Dye Corp. during the seven years preceding his affiliation with Lion Oil.

St. Regis Paper Sets Safety Record in 1950

St. Regis Paper Co. in 1950 lowered its accident frequency rate by 15.7 per cent and the number of disabling injuries by 11 per cent. As a result four plants were given awards in the pulp and paper industry annual safety contest of the

National Safety Council. In the converting division St. Regis multiwall bag plants at Nazareth, Pa., and Dryden, Ont., received first place awards. In the pulp and paper divisions the Kalamazoo, Mich., and East Pepperell, Mass., paper mills were awarded certificates of achievement.

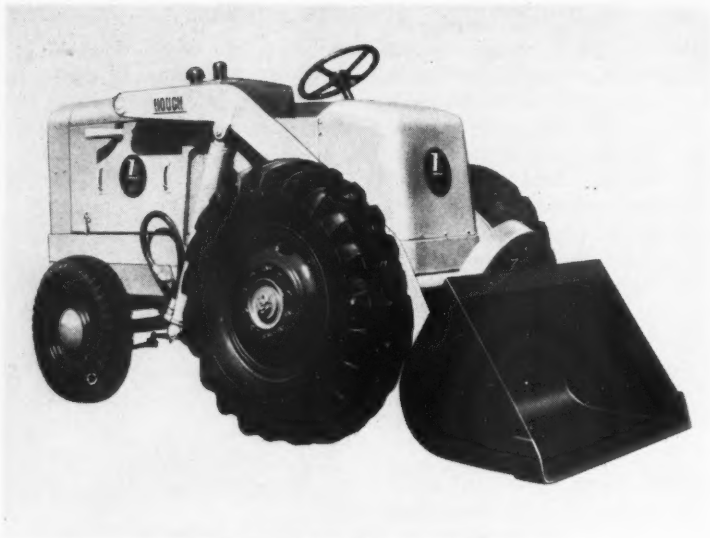
The Nazareth plant received the first place company safety award for the second consecutive year. It also won the Multiwall Bag Division award for the best record in that division and a certificate of merit from the State of Pennsylvania for safety progress within the state. Both the Nazareth and Dryden plants were without a disabling injury in 1950.

Adams Joins USDA

J. Richard Adams, former Director of Technical Services for Spencer Chemical Co., has taken up new duties with the Bureau of Plant Industry, Division of Fertilizer and Agricultural Lime. While a member of the Spencer organization he set up a customer service program and was responsible for descriptive literature on the company's industrial and agricultural products. His Washington job will have special reference to studies of fertilizer production, supplies and consumption.

Spencer has announced that Joe C. Sharp is now Manager of Technical Services with the duties formerly handled by Adams.

Latest Hough Payloader



Hough HAH with ½ cu. yd. bucket

A new addition has been made to the Hough line of Payloader tractor-shovel units. Designated the Model HAH, the new size has a ½ cu. yd. bucket, front wheel drive and a full-reversing transmission giving four forward and four reverse speeds.

Forward to reverse motion is provided by a directional shift independent of the regular gear shift. Top speed forward is 14 mph and top reverse speed is 23 mph when carrying full loads. The engine is mounted at the rear as it is on other Payloader models.

Lifting and lowering, and the dumping and closing of the bucket are accomplished by hydraulic rams. Maximum dumping clearance is 7½ feet and loads can be dumped at any point of the lift either slow or fast. Large pneumatic tires are used on both the driving and steering wheels.

The new model enlarges the Payloader line to seven models. Information on the Hough Payloaders can be obtained by writing AMERICAN FERTILIZER AND ALLIED CHEMICALS.

Potash Sales Up During First Quarter of 1951

A total of 626,290 tons of potash salts was delivered during the first quarter of 1951 by the five major American producers. The equivalent of 358,449 tons of K_2O, it represents an increase of 48 per cent over the amount of salts delivered during the same period of 1950. Part of this increase can be attributed to a strike in the Carlsbad, N. M., mines during January, 1950.

Deliveries for agricultural purposes in the United States, Canada, Cuba, Puerto Rico and Hawaii consisted of 582,621 tons as compared to 217,102 tons of salts in the first three months of 1950.

Muriate of potash (*to page 42*)

(*from page 40*) predominated with 304,658 tons K_2O delivered through March of this year. Shipments of sulfate of potash and sulfate of potash-magnesia totalled 24,824 tons and in addition, 2,033 tons of manure salts were sent out.

New Manager Named by Armour

E. C. Johnson has been named plant manager of the Bartow, Fla., triple-superphosphate plant of the Armour Fertilizer Works. G. C. Gagel will succeed him as plant supervisor at Bartow.

VPI Given Donation for Tagged Element Research

Virginia Polytechnic Institute has received a $3,000 donation from the fertilizer industry for a two-year research project in the use of fertilizer phosphorus as top dressing for permanent pastures and meadows. The gift was made available through the USDA Bureau of Plant Industry, Soils, and Agricultural Engineering.

Researchers at VPI hope to find out the relative value of spring and winter applications of phosphorus fertilizers. They will also test the effectiveness of granulated superphosphates as compared to pulverized superphosphates, and of superphosphates applied in bands with the same materials applied broadcast. Radioactive fertilizer will be used, applied on such crops as ladino clover-orchard grass, and bluegrass-white clover pastures.

The tests will be conducted this year at VPI and at the Northern Virginia Pasture Research Station at Middleburg, a field unit of the main station.

H. W. Clements Dies, Was Bemis' Chicago Sales Manager

Harry W. Clements, manager of the Chicago General Sales Division of Bemis Bro. Bag Co., died during April after an illness of three weeks. Mr. Clements joined Bemis in 1912 as a salesman in Chicago and remained in that city for practically his entire career.

H. W. Clements

New Periodical Covers Industrial Ventilation

American Wheelabrator & Equipment Corp. has published the first issue of "Industrial Ventilation," a new periodical devoted to the latest developments in industrial dust and fume control. Illustrated case histories on the application of Dustube cloth-type filters to dust control problems are included with a technical discussion on the collecting efficiencies of cloth-type filters.

Future editions will present dust and fume control data and information applying to all phases of the chemical and metallurgical industries. Copies can be obtained by writing AMERICAN FERTILIZER AND ALLIED CHEMICALS.

New Pennsalt Multi-Purpose Garden Dust

A garden dust designed to control both insects and plant diseases has been announced by the Pennsylvania Salt Mfg. Company. The Knox Out Multi-Purpose Garden Dust contains more than 50 per cent active ingredients including a new high setting point DDT permitting application on crops sometimes stunted by ordinary DDT.

Sodium fluoaluminate (cryolite) and copper sulfate are also present in the mixture and the combination kills insects as a stomach or contact poison and controls rusts, mildew, and fungi.

It is being placed on the market this year in 12-ounce blower dust guns. Pennsalt says that there is no need for the consumer to keep several insecticides on hand if the Knox Out Multi-Purpose Garden Dust is used.

G-S Light Weight Masks

Light weight protective masks for use in lime, gypsum, talc and similar plants are being manufactured by the General Scientific Company. Called the G-S Protective Masks they consist of an aluminum shield held in place by an elastic head band and contain replaceable laminated filters.

The company claims that they are cooler and more comfortable than other types of masks. They state that they are more frequently used by the worker because of these features and their light weight of only one-half ounce.

For complete information write AMERICAN FERTILIZER AND ALLIED CHEMICALS.

Clark Publishes Material Handling Booklet

"Material Handling News," published by the Clark Equipment Company reports on the material handling lift trucks and devices available from the firm. Dyna-

tork Drive, a Clark feature eliminating the conventional clutch, is described. The company explains that, in this system, engine power is transmitted to the drive axle by magnetic induction across an air gap.

Other developments featured in the magazine include the improved line of Clark electric battery-powered fork-lift trucks, powered hand pallet trucks, battery powered Electro-Lift, gas powered Hydro-Lift, and Clark attachments including the Pul-Pac and Model B clamp.

Write AMERICAN FERTILIZER & ALLIED CHEMICALS if you would like to obtain a copy of the magazine.

Monsanto Booklets on Herbicide Formulations

Four booklets on the formulation of weed control materials have been published by the Monsanto Chemical Company. Two of these concern the contact herbicides, Santophen 20 and Santobrite.

Santophen 20 (pentachlorophenol) is a solid, insoluble in water and used as a concentrated oil solution or an oil in water emulsion. Santobrite (sodium pentachlorophenate) is a stable solid supplied in powder or pellet form. It is formulated as an aqueous solution or oil in water emulsion, the first being used for pre-emergence treatments and as a semi-selective herbicide in some crops.

The other pamphlets cover 2, 4-D and 2, 4, 5-T. For copies of these booklets write AMERICAN FERTILIZER AND ALLIED CHEMICALS.

Ammonium Sulfate from Refinery Wastes

Two refinery waste products are being turned into ammonium sulfate at the General Petroleum Corporation's Torrance, Calif., refinery. The project, completed at a cost of over $250,000, is now producing eleven tons of the fertilizer material daily.

Waste refinery gases are bubbled through sulfuric acid producing a ammonium sulfate solution. The liquid is piped to another vessel where it is turned into crystalline form by partial evaporation of the brine. These crystals are separated by a centrifuge and blown into a hopper from which trucks can be gravity loaded.

Another refinery waste, which presents a tough disposal job, is used instead of pure sulfuric acid. Acid sludge is used in this process instead of the pure material which is in such critical supply. The entire output has been contracted for by the California Farm Bureau Federation, a cooperative buying organization. Fluor Corporation, Ltd., engineered and constructed the new unit.

Ludington Appointed by Chase to Assistant Vice Presidency

At a recent meeting of the Board of Directors of the Cheas Bag Co., F. H. Ludington, Jr., was made Assistant Vice President. Ludington was serving in a managerial capacity at the company's Philadelphia branch when appointed to his new position.

His new headquarters will be in the Chase executive offices in New York where he will assist C. S. Sheldon, Vice-President and Treasurer in charge of Manufacturing, Production, and Engineering.

F. H. Ludington

Engineering Group Asks Anhydrous Ammonia Standards

Groups concerned with the manufacture, distribution, and use of anhydrous ammonia and ammonia solutions have recommended that the American Standards Associa-

Wanted: Assistant Superintendant for fertilizer plant by old established Ohio manufacturer. Age, preferably, between 30 and 40 years, with knowledge of production and maintenance work. When replying give experience, reference and approximate salary expected. Address "335" care AMERICAN FERTILIZER AND ALLIED CHEMICALS, Philadelphia 7, Pennsylvania.

Growing midwest fertilizer company needs plant superintendent. Job now open at one of two plants. A chance for the right man to get in on the ground floor in growing fertilizer industry, which is coming by leaps and bounds west of the Mississippi. Must be experienced and capable. Address "345" care AMERICAN FERTILIZER & ALLIED CHEMICALS, Philadelphia 7, Pennsylvania.

tion organize a committee to develop safety standards, the American Standards Association announced today. At a conference, these groups proposed that the work cover design, construction, location, installation, and operation of anhydrous ammonia systems as well as transportation and storage of anhydrous ammonia and ammonia solutions. Ammonia manufacturing plants, refrigerating, and air conditioning systems would not be included.

The problems of handling and storing anhydrous ammonia have assumed nationwide importance because of the increasingly widespread use of this gas as a soil fertilizer. Since anhydrous ammonia is usually transported in liquid form under pressure in tanks or cylinders, the relation between the strength of the tank and the pressure and temperature under which the gas is handled will be one of the problems to be given careful consideration.

Wasp Venom Has Remarkable Insect-Killing Properties

An insect poison many times more potent than DDT, parathion, or any of the other commonly used insecticides against larvae of the wax moth, is contained in the venom of a tiny parasitic wasp now being studied by Dr. R. L. Beard, entomologist at the Connecticut Agricultural Experiment Station. One drop, so small that it can barely be seen under the microscope, can kill more than 1,600 caterpillars of the wax moth, each many times the size of the wasp itself, when successively transferred from larvae to larvae.

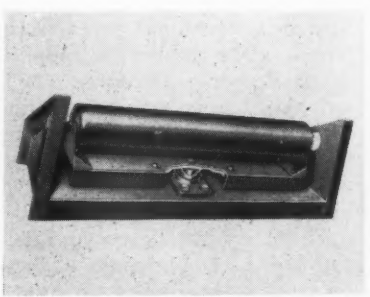
Dr. Beard has done this by extracting the blood from a larva stung by the wasp and then injecting this blood into other larvae of the same species. The action venom is even more startling because, among entomologists, the wax moth is notorious for its ability to resist insecticides.

Self-Aligning Return Idler

An improved type of self-aligning belt conveyor return idler is now being manufactured by Chain Belt Co. It is known as the Rex Style No. 33RA Self-Aligning Return Idler.

Most belt damage from roving occurs at the edges on the return run where the belt is closely confined between the frame and supports. The manufacturer says that this problem is greatly reduced because automatic alignment is provided for the return run of the belt without use of side guide rolls.

It is mounted on a roller bearing turntable, with the entire assembly tilted 45° in the direction of return belt travel. Lateral movement of the belt to one side moves that side of the roll forward, and because of the tilt, downward, decreasing belt pressure on that side. At the same time the opposite side of the belt moves back and upward, increasing belt pressure on its side. Through this action the belt automatically returns to a central position. The idler maintains an equilibrium at the center of the roll.



Chain Belt Return Idler

Chain Belt recommends locating one unit close to the head pulley and another near the tail pulley. Additional units may be placed at ten to fifteen normal return idler spacings as conditions warrant.

Effective with horizontal, inclined or declined conveyors, each idler is equipped for high-pressure greasing. They are supplied with 4-, 5- or 6-inch diameter steel rolls or with a 5½-inch diameter rubber-covered spiral roll.

For additional details on this self-aligning return idler or other Chain Belt equipment write AMERICAN FERTILIZER AND ALLIED CHEMICALS.

Legumes Needs Potash

D. R. Dodd of the Ohio State University reports that high potash fertilizers can be applied to legumes at almost any time, weather and field conditions permitting. Dodd said that one of the main reasons for not being able to hold a legume stand longer than is now practiced is because of the exhaustion of potash and the failure to use high potash fertilizers every year. He recommended the use of a high potash fertilizer such as an 0–12–12.

Link-Belt Promotes Erisman and Foye

Link-Belt Company announces that Maurice J. Erisman, chief engineer at the Los Angeles plant, has been appointed assistant chief engineer for the company's Pershing Road Chicago plant, with headquarters at 300 W. Pershing Road, Chicago. Homer J. Foye, chief engineer at the company's Seattle plant, has been appointed chief engineer at Los Angeles, to succeed Erisman.

Erisman entered the engineering department of the company's Caldwell plant, Chicago, in 1933, upon graduation from Armour Institute, now Illinois Institute of Technology. He was transferred to the Pershing Road, Chicago plant engineering department in 1941, where he later also served as traveling service-engineer for drying equipment before becoming chief engineer at Dallas, Texas in 1944.

Foye was graduated from the University of California in mechanical engineering in 1933. He joined the San Francisco plant in 1935 and served in the engineering department there until 1947, when he was appointed sales engineer, followed in the same year by transfer to Seattle as chief engineer.

Nitrogen Side Dressing Brings Added Profits

L. B. Miller of the University of Illinois claims that the largest return per dollar invested in nitrogen fertilizer for corn should be obtained by side dressing 40-60 pounds of nitrogen per acre at the second or third cultivation. Speaking at the college's Farm and Home Week he said that the report was based on 108 tests made from 1943 to 1950 on 15 soil experiment fields throughout the state.

Tagged Elements . . .

(*from page 25*)

In the North Central Region, at the Michigan Experiment Station, a study will be made of the utilization of phosphorus from granulated and non-granulated phosphatic fertilizers by several crops grown on some Michigan soils.

In the West, scientists at the Utah Agricultural Experiment Station will study the influence of moisture on the availability and utilization of phosphorus. They will try to determine how different soil moisture conditions influence the absorption of phosphorus by plants.

"We can all feel justly proud," writes Dr. Sauchelli, "of the part we in the fertilizer industry have played in bringing this important cooperative research with radioactive elements into being and in helping to move along to important results." In the near future, a summary of the results of all field experiments with radio-phosphorus that were conducted in 1950 will be available to the various contributors. ◆

FERTILIZER TAX TAG SALES AND REPORTED SHIPMENTS

(In Equivalent Short Tons)

COMPILED BY THE NATIONAL FERTILIZER ASSOCIATION

State	*March*		*January-February*		*July-February*	
	1951	*1950*	*1951*	*1950*	*1950–51*	*1949–50*
N. Carolina	.....	.....	615,108	608,423	1,006,393	865,994
S. Carolina	179,846	190,018	348,129	356,610	656,340	556,754
Georgia	284,021	332,172	438,762	358,026	718,215	575,239
Florida	94,454	85,158	279,480	261,351	806,700	729,980
Alabama	167,476	196,178	218,667	152,100	445,681	317,617
Tennessee	56,190	100,283	77,901	42,979	197,419	144,022
Arkansas	53,360	98,191	82,176	41,564	158,109	108,982
Louisiana	65,371	117,217	83,626	56,589	157,853	113,033
Texas	101,512	201,961	113,890	108,242	369,999	323,891
Oklahoma	.....	.....	27,911	29,834	83,519	84,352
Total South	1,002,230	1,321,178	2,285,650	2,015,718	4,600,228	3,819,864
Indiana	70,930	124,727	204,275	172,197	700,439	577,616
Kentucky	76,571	99,928	155,417	154,376	363,180	320,423
Missouri	124,779	84,869	191,397	133,866	454,577	301,850
Total Midwest	272,280	309,524	551,089	460,439	1,518,196	1,199,889
Grand Total	1,274,510	1,630,702	2,836,739	2,476,157	6,118,424	5,019,753

BUYERS' GUIDE • Classified Index to Advertisers in "American Fertilizer & Allied Chemicals"

AGRICULTURAL CONSULTANTS
Bailey & Lerch, Washington, D. C.

AMMONIA—Anhydrous and Liquor
Barrett Div., Allied Chemical & Dye Corp., New York City
Commercial Solvents Corp., New York City
Lion Oil Co., El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

AMMONIUM NITRATE
Lion Oil Co., El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

BAG MANUFACTURERS—Burlap
Bemis Bros. Bag Co., St. Louis, Mo.
Mente & Co., Inc., New Orleans, La.
Virginia-Carolina Chemical Corp., Richmond, Va.

BAG MANUFACTURERS—Cotton
Bemis Bro. Bag Co., St. Louis, Mo.
Mente & Co., Inc., New Orleans, La.
Virginia-Carolina Chemical Corp., Richmond, Va.

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Bemis Bro. Bag Co., St. Louis, Mo.
International Paper Co., Bagpak Div., New York City
Hammond Bag & Paper Co., Wellsburg, W. Va.
Jaite Company, The, Jaite, Ohio
Kraft Bag Corporation, New York City
Mente & Co., Inc., New Orleans, La.
Raymond Bag Co., Middletown, Ohio
Virginia-Carolina Chemical Corp., Richmond, Va.

BAGS—Dealers and Brokers
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex, M., Charleston, S. C.

BAG CLOSING MACHINES
International Paper Co., Bagpak Div., New York City

BAG PRINTING MACHINES
Schmutz Mfg., Louisville, Ky.

BAGGING MACHINES—For Filling Sacks
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

BONE PRODUCTS—Bone Black
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
McIver & Son, Alex M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BORAX AND BORIC ACID
American Potash and Chem. Corp., New York City

BROKERS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BUCKETS—For Hoists, Cranes, etc.
Hayward Company, The, New York City

BUCKETS—Elevator
Baughman Manufacturing Co., Jerseyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

CARS AND CART
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Mach. Works, Aurora, Ind.

CASTOR POMACE
McIver & Son, Alex. M., Charleston, S. C.

CHEMICALS
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
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Davison Chemical Corporation, Baltimore, Md.
International Minerals & Chemical Corporation Chicago, Ill.
Lion Oil Company, El Dorado, Ark.
Koppers Company, Inc., Tar Products Div., Pittsburgh, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.
United States Steel Corp., New York City
Virginia-Carolina Chemical Corp., Richmond, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

CHEMISTS AND ASSAYERS
Gascoyne & Co., Baltimore, Md.
Shuey & Company, Inc., Savannah, Ga.
Wiley & Company, Baltimore, Md.

CONDITIONERS
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Findlay, Ohio
Quakers Oats Company, Chicago, Ill.

COTTONSEED PRODUCTS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.

DRYERS
Sackett & Sons Co., The A. J., Baltimore, Md.

ENGINEERS—Chemical and Industrial
Chemical Construction Corp., New York City
Marietta Concrete Corporation, Marietta, Ohio
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.
Titlestad Corporation, Nicolay, New York City

FERTILIZER (Mixed) MANUFACTURERS
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Davison Chemical Corporation, Baltimore, Md.
International Minerals & Chemical Corporation, Chicago, Ill.
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Virginia-Carolina Chemical Corp., Richmond, Va.

FISH SCRAP AND OIL
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McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

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Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

IMPORTERS, EXPORTERS
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Woodward & Dickerson, Inc., Philadelphia, Pa.

INSECTICIDES
American Agrictultural Chemical Co., New York City
Andrews Sales, Inc., W. R. E., Philadelphia, Pa.
Kolker Chemical Works, Newark, N. J.

LIMESTONE
American Agricultural Chemical Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Findlay, Ohio

LOADERS—Car and Wagon
Hough Co., The Frank G., Libertyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Acid Making and Handling
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Ammoniating
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Grinding and Pulverizing
Atlanta Utility Works, The, East Point, Ga.
Bradley Pulverizer Co., Allentown, Pa.
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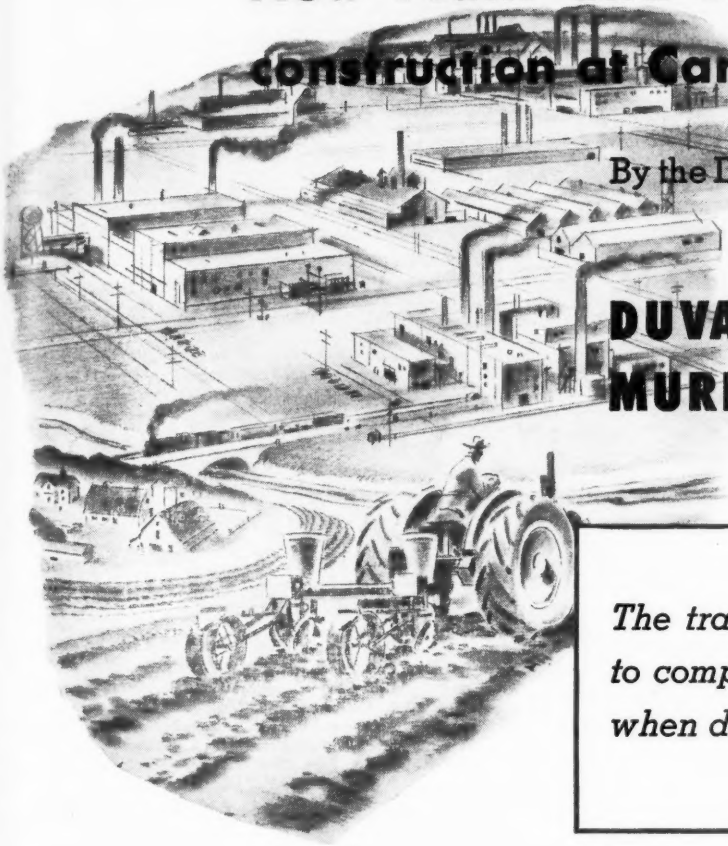
Stedman Foundry and Machine Co., Aurora, Ind.

(Continued on page 50)

ANNOUNCING!

A NEW SOURCE OF POTASH

New Plant and refinery under construction at Carlsbad, N. Mex.



By the Duval Sulphur and Potash Company for the production of

DUVAL HIGH GRADE MURIATE OF POTASH

The trade will be informed as to completion of the plant and when deliveries will start.

ASHCRAFT-WILKINSON COMPANY HAVE BEEN APPOINTED AS EXCLUSIVE DISTRIBUTORS FOR DUVAL SULPHUR AND POTASH COMPANY

Address All Communications to

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DUVAL POTASH FOR BETTER PRODUCTS OF FARM AND FACTORY

Classified Index to Advertisers in American Fertilizer & Allied Chemicals

BUYERS' GUIDE

For Alphabetical List of Advertisers, see page 52

MACHINERY—Material Handling
Atlanta Utility Works, The, East Point, Ga.
Hayward Company, The, New York City
Hough Co., The Frank G., Libertyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Mixing, Screening and Bagging
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Power Transmission
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Superphosphate Manufacturing
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MANGANESE SULPHATE
McIver & Son, Alex. M., Charleston, S. C.

MINOR ELEMENTS
Andrews Sales, Inc., W R., E., Philadelphia, Pa.
Tennessee Corporation, Atlanta, Ga.

MIXERS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

NITRATE OF SODA
American Agricultural Chemical Co., New York City
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Ashcraft-Wilkinson Co., Atlanta, Ga.
Barrett Div., Allied Chemical & Dye Corp., New York City
International Minerals & Chemicals Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.

NITROGEN SOLUTIONS
Barrett Div., Allied Chemical & Dye Corp., New York City
Lion Oil Company, El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

NITROGENOUS ORGANIC MATERIAL
American Agriculture Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NOZZLES—Spray
Monarch Mfg. Works, Philadelphia, Pa.

PHOSPHATE ROCK
American Agricultural Chemical Co., New York City
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Ashcraft-Wilkinson Co., Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Virginia-Carolina Chemical Corp., Richmond, Va.

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Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Monsanto Chemical Co., St. Louis, Mo.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.
Titlestad Corporatian Nicolay, New York City

POTASH SALTS—Dealers and Brokers
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.

POTASH SALTS—Manufacturers
American Potash and Chemical Corp., New York City
Potash Co. of America, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
United States Potash Co., New York City

PRINTING PRESSES—Bag
Schmutz Mfg. Co., Louisville, Ky.

REPAIR PARTS AND CASTINGS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

SCALES—Including Automatic Bagging
Atlanta Utility Works, The, East Point, Ga.
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Stedman Foundry and Machine Co., Aurora, Ind.

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SEPARATORS—Air
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SPRAYS—Acid Chambers
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STORAGE BUILDINGS
Marietta Concrete Corporation, Marietta, Ohio

SULPHATE OF AMMONIA
American Agricultural Chemical Co., New York City
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Ashcraft-Wilkinson Co., Atlanta, Ga.
Barrett Div., Allied Chemical & Dye Corp., New York City
Jackle, Frank R., New York City
Koppers Co., Inc., Tar Products Div., Pittsburgh, Pa.
Lion Oil Co., El Dorado, Ark.
McIver & Son, Alex. M., Charleston, S. C.
Phillips Chemical Co., Bartlesville, Okla.
United States Steel Corp., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULPHATE OF POTASH—MAGNESIA
International Minerals & Chemicals Corporation, Chicago, Ill.

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Texas Gulf Sulphur Co., New York City

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American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U.S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

SUPERPHOSPHATE
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Davison Chemical Corporation, Baltimore, Md.
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U.S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

SUPERPHOSPHATE—Concentrated
Armour Fertilizer Works, Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
U.S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

TANKAGE
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

VALVES
Atlanta Utility Works, The, East Point, Ga.
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WEED KILLERS
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Lion Anhydrous Ammonia—Manufactured in Lion's modern plant to an 82.25% nitrogen content under accurate chemical control, the uniformity and high quality of this basic product are assured.

Lion Aqua Ammonia—This product is available to manufacturers for use in the formulation of mixed fertilizers or for sale as direct application material. Normally about 30% ammonia, its content can be controlled by order to suit your needs.

Lion Nitrogen Fertilizer Solutions—Made specifically for the manufacturing of mixed fertilizers, these products supply both ammonia nitrogen and nitrate nitrogen in the ratios desired. They are easily handled and available in three types designed for varying weather conditions, and for formula requirements in the production of fertilizers that cure rapidly, store well and drill evenly.

Lion Ammonium Nitrate Fertilizer—The improved spherical white pellets in this product contain a guaranteed minimum of 33.5% nitrogen. They flow freely, resist caking and store much better. Lion Ammonium Nitrate Fertilizer is shipped in 100-pound, 6-ply bags with two moisture-proof asphalt layers.

Lion Sulphate of Ammonia—This new, superior-type sulphate is guaranteed to contain a minimum of 21% nitrogen. Through special conditioning of the larger crystals, moisture and free acid content is greatly reduced. These factors, together with the special coating applied, make for greater resistance to caking in shipment or in storage. This product flows freely. It is shipped in bulk and in 100-pound, 6-ply bags laminated with asphalt.

"Serving Southern States"

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He's Wearing a Mask...

But Is He Safe?

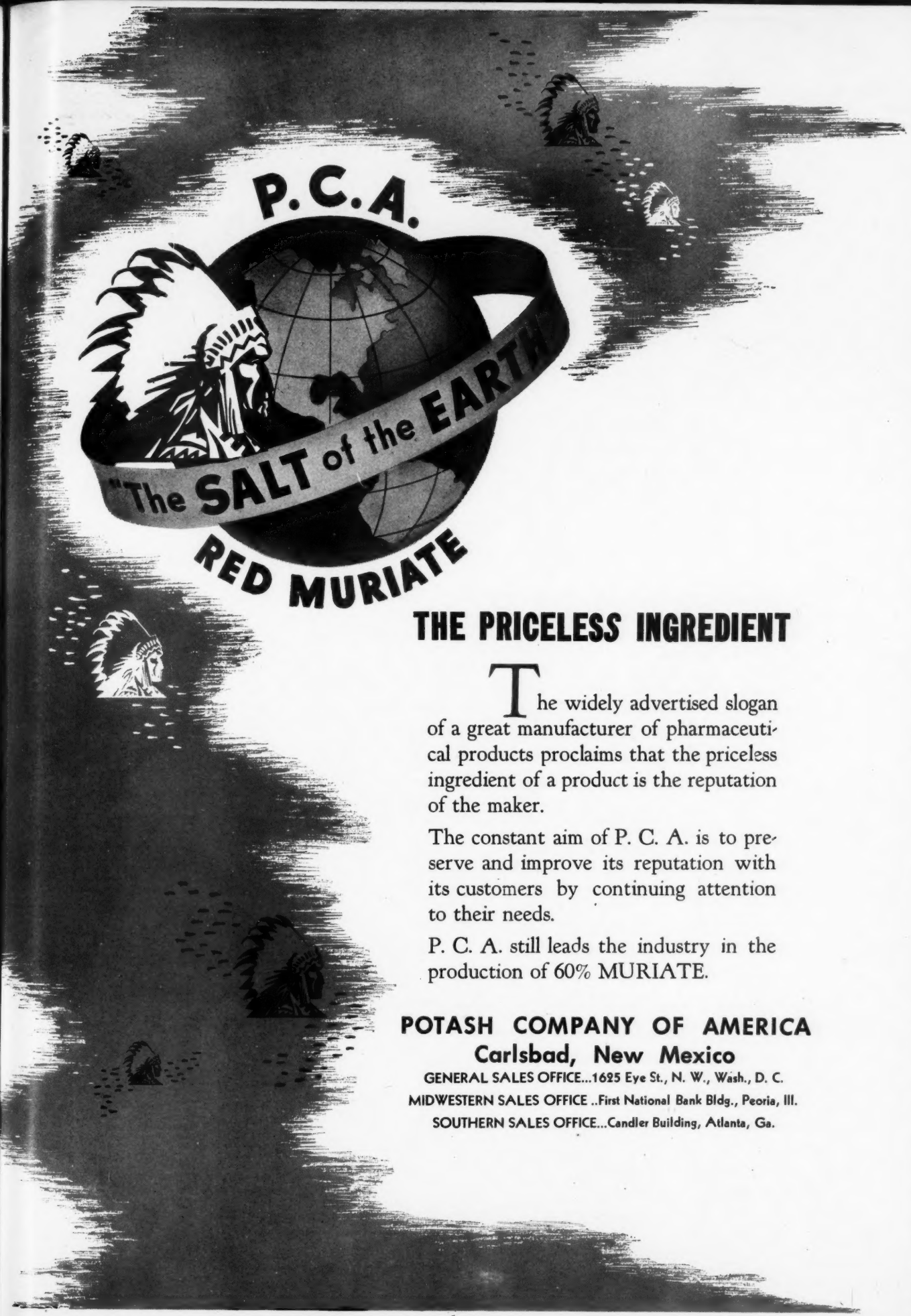
The orchard worker shown above is mixing parathion dust and water with which to spray the trees in the background. Yes, he's wearing a mask and gloves . . . but is he safe?

The picture was received as part of a news release stressing the protective qualities of the respirator the man is wearing. The mask is undoubtedly a good one that protects the man's respiratory system from harmful vapors and dusts. His hands are protected, presumably by gloves of the proper material and design. But how about the man's arms?

Instead of illustrating the use of protective face masks, the above picture might well be used to illustrate why a number of people have been killed as a result of improperly handling various pesticides. Many of these substances can be absorbed in fatal doses through the tissues of the skin . . . and not just the skin of the hands. Obviously, an educational program is in order.

Manufacturers and formulators of poisonous farm chemicals might well launch an extensive program of this nature so that the tremendous advantages of many highly-effective pest-control chemicals may not be blighted by adverse public opinion and superstitions as to their safeness. Several independent organizations such as the National Safety Council, are prepared to help with any such program.

Outside of that, and seeing to it that your own products are properly and plainly labeled as to the hazards involved in their use, there isn't much you, as a manufacturer, can do to protect operators in the field. In your own plant it is a different story, and in a series of forthcoming articles AMERICAN FERTILIZER & ALLIED CHEMICALS will outline what formulators can do to insure safe handling of pesticidal materials within their own plants.



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—he used a fertilizer containing International Potash

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SUL-PO-MAG (Water-Soluble Double Sulfate of Potash-Magnesia)
MURIATE OF POTASH • SULFATE OF POTASH

Sul-Po-Mag®
Water-Soluble
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